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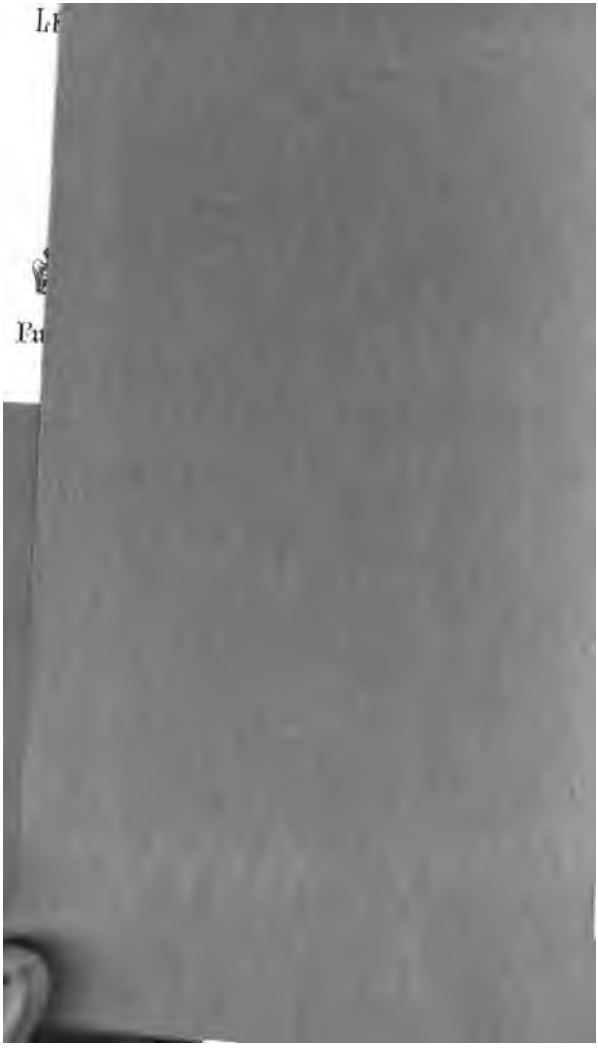

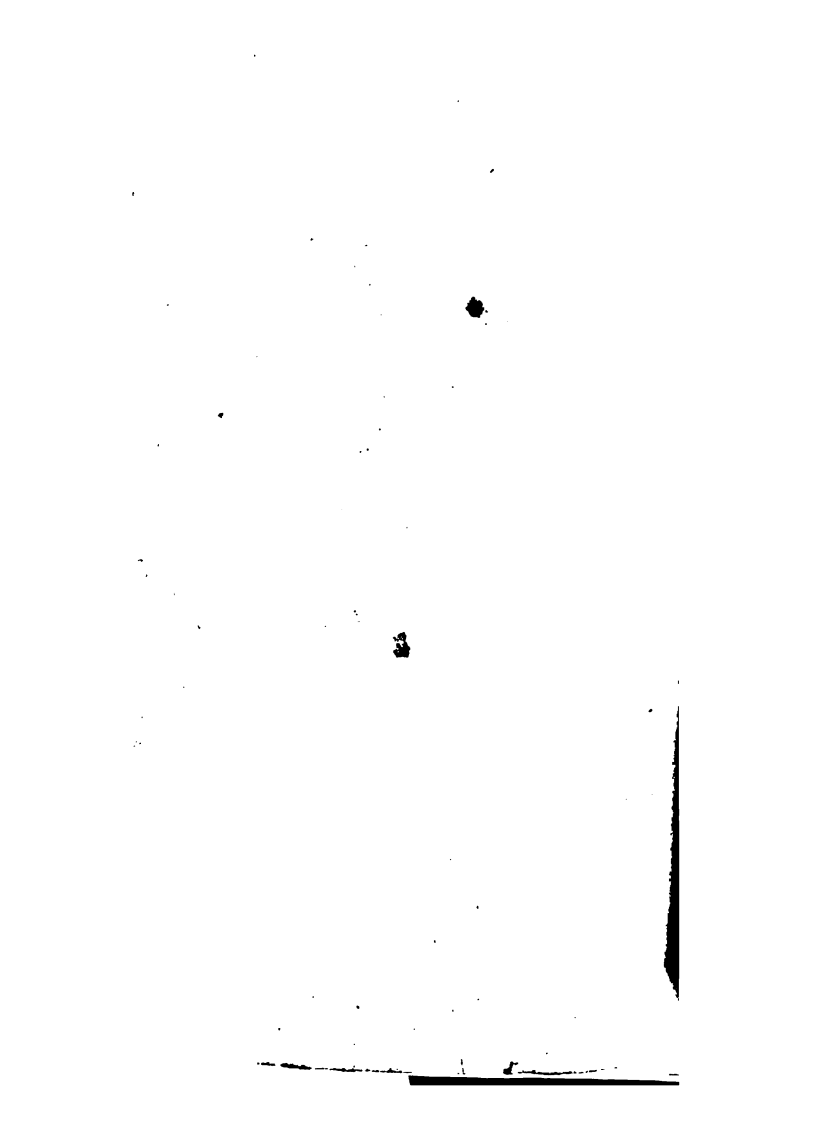

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*A Professor explaining the Polite Arts, to his Pupils.*

A

SHORT SYSTEM

OF

# POLITE LEARNING,

BEING

AN EPITOME

OF THE

## ARTS AND SCIENCES,

FOR THE USE OF SCHOOLS.

SEVENTH AMERICAN EDITION, IMPROVED,
BY AN EMINENT WRITER OF PHILADELPHIA.

A taste of every sort of knowledge is necessary to form the mind, and is the only way to give the understanding its due improvement to the full extent of its capacity.

LOCKE.

PHILADELPHIA:

PUBLISHED BY BENJAMIN WARNER,
NO. 171 MARKET STREET.

1820.

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# PREFACE.

THE present is designed as an improvement of the sixth American edition of this valuable little work. No alteration has been made in the collection of scientific matter: indeed, none could, advantageously, be accomplished. The subjects, originally chosen, appear the best adapted to combine utility with conciseness. Much, however, has been done, to render the compilation more instructive. The language has been refined; the punctuation completed and corrected; the definitions are given with more clearness, and modern discoveries in natural philosophy substituted in the room of long exploded speculations. The civil divisions, in the *geographical* department, have been assimi-

lated to the present time; and political institu
tions, as well as statistical accounts, have be
equally the object of attention. Chronologi
errors, it is presumed, will, in the present ed
tion, seldom be detected; and inaccuracies
every kind, accumulated in all works, wh
long confided to the sole examination of t
printer, without the occasional superintenden
of the author, are as few, the editor believe
as the variety of matter, contained in a book
this nature, will admit.

The *Arts and Sciences*, by being wrapped u
in the learned languages, and obscured by
multitude of technical terms, have long be
held beyond the reach and capacity, not only
youth in general, but of maturer years also; e
pecially, where the advantages of educatio
have been limited. This epitomè, howeve
will, it is hoped, bring them to the level of t
most moderate capacity; and without much e
*pense, either* of time or money, furnish a tole

ably correct outline and general idea of all the principal branches of useful and polite literature.

This little volume will be found to contain information upon a great variety of pleasing and highly interesting subjects, well worthy the attention of youth in every walk of life; but it must be peculiarly acceptable to those whose time at school is somewhat limited, and whose leisure for reading is so contracted, as to preclude an opportunity of their looking into larger works and more detailed systems of those things, of which, not to know something, must, at this enlightened day, be considered as reproachful.

Philadelphia, March 27th, 1820.

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# A SYSTEM

OF

# POLITE LEARNING.

## OF ARTS AND SCIENCES

*Question.* WHAT is meant by a Science?

*Answer.* A system of any branch of knowledge, comprehending its doctrine, reason, and theory; without any immediate application of it to the uses of life.

Q. What is an art?

A. A collection of rules and precepts for doing a thing surely, readily, and gracefully; or knowledge reduced into practice.

Q. How are the arts divided?

A. Into liberal and mechanical.

Q. What are the liberal arts?

A. Those that are ingenious, or cultivated without any immediate regard to the profit arising from them; as poetry, music and painting; rhetoric, grammar, and sculpture.

Q. Why are they called liberal?

A. Because the ancients allowed them to be studied only by the *liberi* or free persons.

Q. What are the mechanical arts?

A. Those wherein the hand and body are more concerned than the mind, and which are cutlivated for the sake of the profit attending them: as cabinet-making, ship-building, and weaving; turnery, masonry, and carpentry; popularly known by the name of *trades.*

Q. Why are they termed mechanical?

A. They take their denomination from a Latin word, [*machina*] signifying a *machine;* as being all practised by means of some machine or instrument.

Q. What are the principal sciences?

A. Theology, philosophy, and jurisprudence; physic, rhetoric, grammar, poetry, and mathematics.

## THEOLOGY.

Q. WHAT is theology?

A. A science which instructs us in the knowledge of God, and Divine things, and teaches us the manner in which we should serve our Creator.

Q. Whence, is the word theology derived?

A. From two Greek words [*Theos logos*] signifying *the word of God.*

Q. How is theology divided?

A. Into natural and revealed: natural, is the knowledge we have of God from his works, by the light of nature and reason; and revealed is that which we obtain by revelation.

Q. To whom, was the title of theologist, or divine, first given?

A. To St. John, the evangelist; who was by that title distinguished from the other three evangelists: because their gospels contain only the history of Christ, but that of St. John establishes his eternal divinity (as the word of God) and his incarnation.

## RELIGION.

"The fear of the Lord is the beginning of wisdom: a good understanding have all they that keep his commandments." DAVID.

"Be particular not to neglect religion in the education of your children. In vain will you endeavour to conduct them by another path. If they are dear to you; if you expect from them credit or comfort; from religion, must be derived their happiness, and your own."

FATHER GERDIL.

Religion, soother of all our keenest sorrows, source and refiner of all our real joys! shed thy heavenly influence on our souls; direct, animate, and crown, all our pursuits; pervade and consecrate all our thoughts, words, and actions; so, shall we answer the design of God in our creation, taste true happiness in this life, and arise to complete an immortal felicity in the world to come.

Dr. ASH.

Q. What is religion?

A. That worship or homage due to God, considered as Creator and Preserver of the world.

Q. What is the foundation of religion?

A. The existence of a God; who requires service and adoration from his creatures.

Q. Whence, is this knowledge obtained?

A. From the dictates of natural reason, and the express declaration of God himself, by the mouths of prophets, &c.

Q. Are there not several religions in the world?

A. There are four principal ones; the Christian, the Jewish, the Pagan, and the Mahometan.

Q. Who was the author of the Christian religion?

A. Jesus Christ, the Son of God; who left the bosom of the Father, to dwell in flesh and blood here on earth: where, after performing many miracles, and works of beneficence, he was crucified and buried; but, the third day, he rose from the dead, and shortly after ascended to the Father.

Q. How is the Jewish religion founded?

A. On the law given by Moses to the Israelites, as contained in the Old Testament.

Q. What is the Pagan religion?

A. The idolatrous rites performed by the Pagans, or heathen nations; who worship and adore false gods, or give those honours to creatures, and the works of man's hand, which are due only to God.

Q. When, and by whom, was the Mahometan religion founded?

A. In the seventh century, by the impostor Mahomet; whose whole doctrine is a ridiculous compound of Paganism, Judaism, and Christian heresies.

Q. What are the advantages derived to society from true religion?

A. They are many—it inspires sincerity in all men, justice in princes, integrity in magistrates, obedience to the laws, honesty in trade, and union in families.

## PHILOSOPHY.

Q. WHAT is philosophy?

A. The study of nature and morality, as they are founded upon reason and experience.

Q. Whence, is the word philosophy derived?

A. From a compound Greek word, [*philosophia*] signifying *the love of wisdom.*

Q. Into how many parts is it divided?

A. Two; theoretical and practical. The *theoretical* part is employed in the bare contemplation of nature, and of natural things; and is subdivided into physics and metaphysics: the *practical*, is that which lays down rules for, and excites to, the practice of a virtuous life; being subdivided into *logic* and *ethics.*

## LOGIC.

Q. What is logic?

A. The art of thinking justly; or of using reason well in our inquiries after truth, and in the communication of it to others.

Q. In what, does this art consist?

A. In the reflections made by men upon the four principal operations of the mind; perception, judgment, reasoning, and disposition.

Q. What is perception?

A. It is the act of seeing, conceiving in the mind or apprehending, the existence, nature, or properties of what we contemplate.

The result of perception, is an *idea*, or mental image: i. e. the view which the mind takes of objects now no longer present; as the *mountain* which we saw, and the *orator* which we heard, though absent, are yet before the eye of the mind.

Q. What is judgment?

A. Judgment is that operation of the mind, by which we compare two or more ideas together with a view to determine whether they agree or disagree.

A judgment expressed in words, is called a *proposition:* of which there are several kinds; namely *affirmative, negative,* conditional, &c. as—

*Man is a rational being. Birds and beasts do not reason. If the sky fall, we shall catch larks.*

Q. What is *reasoning?*

A. *Reasoning* or argumentation is that operation of the mind by which we draw our conclusions on subjects, which, in themselves, are not clear, by comparing them with other similar subjects, which are clear, known, and evident; as—

*If the sun be risen, the night is past:*
*But the night is not past:*
*Therefore, the sun is not risen.*

*All wicked men are miserable:*
*Tyrants are wicked men:*
*Therefore, tyrants are miserable.*

These conclusions, or acts of reasoning, when true, are called *syllogisms;* as in the preceding examples: but when *false,* they are termed *sophisms;* as—

*A church is a building of stone:*
*A religious assembly is a church:*
*Therefore, a religious assembly is a building of stone.*

Q. What is disposition?

A. *Disposition* or arrangement, is the order into which our perceptions and reasonings, on any sub-

ject, are thrown, with a design of getting the cl
est possible knowledge of it, ourselves, and of c
municating it most effectually to others.

Q. To whom. is logic most useful?

A. It is useful to all men; particularly, to tl
who have to teach or reason with others: as pr
ers, lawyers, legislators, &c. The art of log
nothing more than the natural system of reaso
methodised. All who think and judge for th
selves, though many are unconscious of it, const
ly use logic.

## ETHICS.

Q. What are ethics?

A. The doctrine of manners, or the scienc
morals in the behaviour and conduct of man, ei
in public or private life.

Q. What is the object of this science?

A. The exercise of right reason in all the circ
stances of our actions, affairs, and relations, in
so that we may arrive at the highest degree of n
al perfection and beatitude.

## PHYSICS.

Q. What are physics?

*A. The doctrine* of natural bodies, their phe
*mena, causes,* and effects; with their various s

tions, motions, and operations. Physics are also called *physiology*, and *natural philosophy*.

Q. In what does this science instruct us?

A. It teaches us to explain all the phenomena of the earth: as, the atmosphere, meteors, earthquakes, tides, &c.

Familiarly, we say, that nature employs four elements—earth, water, air, and fire: but, philosophically, the elements, or radicals, amount to nearly fifty; as all those, except fire, the caloric of the modern chemists, are compounded bodies.

### OF THE ATMOSPHERE.

Q. What is the atmosphere?

A. A transparent, invisible, elastic fluid, encompassing the earth, and moving along with it in its annual and diurnal motions.*

Pure atmospheric air is composed of three gageous substances, only—oxygen, nitrogen, and carbonic acid gas; in the proportion of 22 parts of oxygen, 77 of nitrogen, and 1 part in a 100 of the last. But the air that we breathe, is perpetually contaminated by a variety of exhalations from the earth.

* Mr. Boyle found by experiment, that air, by its elasticity, would so expand itself as to occupy 13,769 times more space than contained it before. And we know that air may be compressed to 128th part of the space it naturally *occupies*. *Its* expansion and compressibility, may, *however, be considered* as infinite.

Oxygen is the principle of combustion, and the vehicle of heat; and is absolutely necessary for the support of animal life.

Nitrogen is chiefly distinguished by its being incapable of supporting combustion, or animal life. It has the effect of neutralizing, in some measure, the properties of oxygen; thus, rendering it fit for breathing and promoting combustion: and is highly favourable to vegetation.

Carbonic acid gas is formed by the respiration of animals, and by combustion. It is the proper nutriment of vegetables; which nature has endowed with organs for its decomposition.*

Q. Of what gravity, is the atmosphere, and what are its principal effects?.

A. A quart of atmospheric air, at the earth's surface, weighs 16 grains; being 914 times lighter than rain water: but, from its great height, it presses upon the earth, and all the bodies thereon, so powerfully, as to bind them down with a force amounting to upwards of 15 pounds weight upon every square inch: hence, it prevents the vessels of animals and plants from being too much distended by the impetus of the circulating blood and juices.

* One gallon of common air is sufficient for a man during the space of one minute, and no longer: a lighted candle, also, destroys the vivifying quality of a gallon of air *in one* minute, and without a fresh supply, it will cease to *burn.*

Q. Is the atmosphere of the same density and heat, at all distances from the earth?

A. No: the air is lighter, in geometrical proportion, the higher we ascend: and its heat also decreases; but not in a similar ratio.

By that lessening in gravity, the altitude of mountains is known; from the falling of the mercury in the barometer.

## OF METEORS.

Q. What is a meteor?

A. A transient body, or the resemblance of a body, formed in the atmosphere, and exhibiting various appearances.

Q. How are meteors divided?

A. Into three kinds: the igneous, aerial, and aqueous. Of the igneous kind, are, lightning, aurora borealis, ignis fatuus, and other fiery phenomena. The aerial, consists of winds. The aqueous, are composed of vapours, or watery particles, variously separated, and condensed, by cold: such are, clouds, hail, and snow; rain, waterspouts, dew, and the like.

## ELECTRICITY.

Q. WHAT is Electricity?

A. *Electeicity*, or *electrical matter*, is a subtle
e which pervades all nature, and produces most
gular and extraordinary phenomena.

It is the cause of *thunder and lightning*, the *au-
ra borealis*, and, in many instances, of *earth-
ikes*.

The *science* of *electricity* is the art of moving,
l accumulating, this astonishing agent; so as to
ıibit its various effects.

Q. How does it appear that thunder and light-
ıg are the effects of electricity?

A. Dr. Franklin has proved, by a variety of ex-
iments, that the lightning of electricity, and that
ich flashes in the clouds during a thunder storm,
of exactly the same kind, and operate in the
same manner.

### OF LIGHTNING AND THUNDER.

Q. What is Lightning?

A. A large, bright flame, darting swiftly through
air; of momentary duration, and commonly at-
ıded with thunder.

Q. *How is this* meteor accounted for?

In the present advanced state of electricity, ning is universally allowed to be an electrical omenon: for, as before observed, it has been ed by a variety of experiments, that the light- of electricity, and the lightning which glares e clouds, are precisely the same; both in kind operation.

What is the cause of lightning?

The air, when in one place, electrified posi- y, and in another, negatively, (according to the y of Franklin,) causes particular clouds, and ent parts of the earth, to possess opposite elec- ies; so that, on their approach within a cer- distance, a discharge will be made from the nto the other; and, in the discharge, a flash of ning will be observed.

How is thunder produced?

By a concussion in the air, from an electrical sion; the rattling noise being probably caused e sound excited among clouds hanging one another, and the agitated air passing irregular- tween them.

What is the reason that thunder is not heard me time after the lightning is seen?

Because sound is much longer in arriving at ars, than light is at our eyes: for, light moves st instantaneously; but sound moves only at ate of 1142 feet in a second.

Q. I have heard of thunderbolts, and of t strange effects: pray, what are they?

A. What is vulgarly called a thunderbolt only lightning when it acts with extraordinary lence, and breaks or shatters any thing. When explosion is high in the air, it will do no mise but, when near the earth, it may kill animals, troy trees, burn houses, &c.

Q. How can we ascertain its distance?

A. It may be estimated by the interval of between the flash and the noise. The ordi difference between the two, is about seven sec which, at the rate of 1142 feet in a second, g the distance of about a mile and a half: but s times it comes in a second or two; which sl that the explosion is very near us, or even an us.

## OF THE AURORA BOREALIS.

Q. What is the aurora borealis?

A. An extraordinary luminous meteor, sho itself in the night after a dry season, chiefly in northern parts of the atmosphere; and, hence vulgar give it the name of *northern lights streamers*.

Q. Pray, describe this meteor.

A. It appears most commonly in the form *arch; partly bright*, and partly dark: but al

transparent, and usually of a red colour, inclining to yellow. It sends out frequent coruscations of pale light, which seems to rise from the horizon in a pyramidial undulating form, and shoot with great velocity, toward the zenith, or that point which is immediately over the head of the spectator.

Q. How is it accounted for?

A. It is deemed an electrical phenomenon, and supposed to be occasioned by the flashing of electric fire, from positive towards negative parts of the atmosphere, at a great distance, and in the upper region where the resistance is least; and that it appears chiefly in the northern parts, because the alteration in the heat of the air is there the greatest.

### OF THE IGNIS FATUUS.

Q. What is the ignis fatuus?

A. A commen ignited meteor; chiefly seen at night, in meadows, marshes, and other moist places. It is known among the vulgar by the appellations, *Will-with-a-wisp*, and *Jack-with-a-lantern*.

Q. How is this phenomenon explained?

A. The late discoveries ascribe it to inflammable air; arising from the putrefaction and decomposition of vegetable substances in water, and taking fire by means of the electrical matter contained

in fogs. In short, positive and negative electricity in the air, with a proper quantity of moisture to serve as a conductor, will readily account for these and other, fiery phenomena.

## OF WIND.

Q. What is wind?

A. A sensible agitation of the air, by which a large quantity flows in a current, out of one region into another.

Q. What are the principal causes of this agitation?

A. Local alterations in the state of the air, by means of heat. For, when the air is heated over one part of the earth more than over another, the warmer air, being rarefied, becomes specifically lighter than the rest: it is therefore overpoised by it, and raised upwards; the higher parts of it diffusing themselves every way over the top of the atmosphere; while the neighbouring air below rushes in on all sides, till the equilibrium is restored. Hence, we may account also for the ascending of smoke in a chimney; and for the rushing of the air through the keyhole of a door, or any small chink into a room where there is a fire.

Q. *How are the* winds divided?

A. Into four principle ones; the north, south, east, and west; which take their names from the four cardinal points of the world.

Q. What is the nature of each?

A. In the northern hemisphere, the *north* wind is cold; because it comes from the frigid zone, or countries remote from the influence of the sun: the *east*, is damp; because it comes from the bosom of the Atlantic, where it imbibes large quantities of vapour: the *west*, coming from temperate regions across the American continent, is pleasant, pure, and exhilarating: the *south*, coming from the torrid zone, is warm.

Q. Are the winds deemed beneficial?

A. Besides their use in moving various machines, and their utility in navigation, they serve to purify and refresh the air, to convey the heat or cold of one region to another, and to produce a circulation of vapours from the ocean to inland countries. But, though their effects, on the whole, may be of great benefit, their violence is sometimes very detrimental. For,

When a violent and very sudden alteration happens in any particular part of the atmosphere, by means of a cloud, or of some electrical cause, which occasions a rushing in of the air from all points, an impetuous wind is produced, turning rapidly every way, and threatning ruin. This is called a *whirlwind*. And,

When these causes are numerous and very violent, accompanied with lightning and thunder, the wind becomes so furious and terrible, that it overthrows houses, roots up trees, and destroys every thing in its course. This is denominated a *hurricane.*

The velocity of wind, in what is termed a gentle breeze, may be from four to six or eight miles an hour; a strong breeze or brisk wind will travel perhaps from ten to fifteen miles an hour; and a hurricane or tempest probably not less than fifty or sixty miles.

The air is often observed, in different regions, to move in contrary currents; and this, almost, always, previous to thunder.

Q. What are clouds?

A. A quantity of condensed vapours, suspended in the atmosphere.

Q. How are they formed?

A. From a collection of watery particles, raised from the earth by solar and subteraneous heat: the particles, at their first rise, are too minute and separate to be perceived; but, meeting, in their ascent, with a greater degree of cold, they are condensed and their parts united, so as to reflect light, and become visible.

Q. At what height, do you suppose the clouds to be suspended?

A. From about a quarter of a mile to two miles; according to their specific gravity, and to the elasticity of the atmosphere. They are frequently visible below the tops of very high hills.

Q. Whence, are their various forms and colours?

A. Their figure results from their loose texture; changing into any form according to the different currents of the air: and their colour is owing to their particular situation with regard to the sun, and the different reflections of his light.

It appears from the observable motion of the clouds, that there are different currents in the air, at the same time, and in the same quarter, under one another.

## OF THE RAINBOW.

Q. What is a rainbow?

A. A meteor in the form of an arch, exhibited in a rainy atmosphere, opposite to the sun.

Q. Of what colours, does it consist?

A. They are, beginning from the upper part, red, orange, yellow, green, blue, indigo, and violet; which are called the seven *primary colours:* for, all other colours are composed of some of them.

Every ray of light is a compound body; consisting of these seven colours: but mixed in *such proportions, as to* produce the appearance of white.

As these colours possess different degrees of frangibility. they are easily separated. Let a ray of light pass through a drop of water, and the violet will suffer a greater refraction than the red; consequently, they will be separated.

Q. How is the rainbow formed?

A. It is made by the rays of the sun being refracted in the drops of falling rain, and thence reflected to the eye of a spectator, who is between the sun and the rain.

Q. How are the various colours produced?

A. By the different refractions of the rays, transmitted to the eye from several drops; one higher than another: the rays least refracted producing red; those most refracted, violet; and the intermediate ones, the other colours, in the order before mentioned.

Q. I have sometimes observed two bows, one above the other; how are these accounted for?

A. The interior and stronger one is produced by one reflection; the exterior and fainter, by two; when the latter is visible, its colours lie in a contrary order to the other.

The doctrine of the rainbow is confirmed by an easy experiment: for, upon hanging up a glass globe full of water, in the sunshine, and viewing it in such a position, as that the rays, which come from the globe to the eye, may, with the sun's rays, include an angle *of about* 42°, the spectator will see a full red

colour in that side of the globe *opposite* the sun: and if that angle be made a little less by depressing the globe or raising the eye, the other colours yellow, green, and blue, will appear, successively: but if the angle be made about 50°, there will appear a *faint* red colour in that side *towards* the sun; and if the angle be made greater, the other colours will be seen, in their regular order.

Q. How is the *lunar* rainbow formed?

A. Exactly in the same manner as the other; by the beams of the moon falling upon the bosom of a shower.

Q. How is that lucid ring, called the *halo*, which we sometimes see diffused around the moon, accounted for?

A. As it always appears in *rainy* or *frosty* weather, we may suppose it occasioned by the refraction of light, in the watery, or frozen particles, of the atmosphere.

### OF HAIL.

Q. What is hail?

A. An aqueous concretion, generally round, but sometimes angular, triangular &c. according to the suddenness of its first formation, and the degrees of cold through which it passes in its descent.

Q. How is it produced?

A. *It is supposed* to be formed in the high re-

gions of the air; where the cold is intense, and where the electric matter is very copious: for, in these circumstances, a great number of particles of water being brought near together, are frozen, and in their descent collect other particles: so that the density of the substance of the hailstone decreases from the centre; this being formed first in the upper regions, and the surface being collected in its falling through the lower.

OF SNOW.

Q. How is snow produced?

A. It is formed in the middle region of the atmosphere; of particles of water there congealed, and to which, similar particles unite and still accumulate as they descend through a cold air, till they fall to the earth in what we term flakes of snow.

Q. Why are those flakes so light?

A. Their lightness is owing to the extent of the surface, in comparison with the matter cotained under it; as gold itself may be extended in surface till it will float upon the least breath of air.

Q. What is the cause of their whiteness?

A. The particles of ice that compose these flakes, being solid, transparent, and differently arranged, reflect the light from every part.

*Q. Of what* benefit is snow to the earth?

A. It furnishes a covering for corn and other vegetables: by which they are guarded from the intense cold of the air; especially, from piercing winds and hard frosts. It also prevents the internal heat of the earth from escaping; and, when melting, it moistens and pulverizes the soil, which had been bound up by the frost; and thereby promotes vegetation.

### OF RAIN.

Q, What is rain?

A. A precipitated cloud, descending in the form of drops of water; or, snow, dissolved in passing through the lower and warmer region of the atmosphere. Rain, therefore, has its origin in regions below those of snow and hail.

Q. How do you account for the various sizes of drops of rain?

A. On mountains, drops of rain as well as flakes of snow, and hailstones, are very small; and the more intense the electricity is that forms them, the larger they are. Their bulk is also increased from the length of their descent through a humid atmosphere; by attracting particles of vapour as they fall: for, it is known, that a vessel placed on the top of a high tower, will not collect so much rain, as another of the same dimensions, set on the *ground.*

Q. What are the chief uses of rain?

A. It moistens and softens the earth, and, thu fits it for affording nourishment to plants. By fal ing on mountains, it carries down with it man particles of loose earth, which serve to fertilize th surrounding valleys: it purifies the air from noxiou exhalations, which tend, in their return to the earth to meliorate the soil: it moderates the heat of th air: and it is one means of supplying fountains an rivers. It is supposed, there was no rain before th Flood, but that the earth was moistened by plenti ful dews or mists: of course, there could have bee then no rain-bow; a meteor recorded in the Bibl as appearing, for the first time, after that great oc currence.

OF FOG AND DEW.

Q. What is fog?

A. Fog or mist, is a meteor, consisting o gross vapours, floating near the surface of th earth.

Q. How is it formed?

A. By vapours raised from the earth, which meet at their first entrance into the atmosphere, witl cold, sufficient to condense them considerably: thei specific gravity being thus increased, their ascen is stopped at some particular height, and they eithe remain suspended for some time, or return back in *a kind of drizzly rain.*

When these vapours are very light and subtle, and become condensed by the coldness of the night before they arrive at any considerable height, they return back in imperceptible drops; and form what is called *dew*.

Fogs are only low clouds, or clouds in the lowest region of the air; and clouds are nothing more than fogs raised on high.

## OF WATER SPOUTS.

Q. What is a water spout?

A. It is a large column of water, rising in a spiral form from the agitated ocean, with a frightful rushing noise, to a vast height in the air.

Q. What is the cause of this phenomenon?

A. Dr. Franklin ascribes it to the same cause which produces whirlwinds; namely, the rarefaction of the air; an hypothesis which is strengthened by its seldom appearing except in warm climates.

Q. Do water spouts often occur?

A. Yes, in the vicinity of the equator they are very frequent, and would often, endanger or destroy ships, were not means found to reduce them before their very near approach. A water spout is readily destroyed by firing a cannon: the pressure of the surrounding air is thus decreased, by rarefaction, and, consequently, it is expanded, and falls upon the ocean in the manner of a heavy shower.

## OF EARTHQUAKES.

Q. What is an earthquake?

A. A tremendous agitation of some considerable part of the earth, attended with a noise like thunder; and frequently with an eruption of wind or smoke, water or fire. It is, undoubtedly, the greatest and most formidable phenomenon of nature.

Q. Whence, the cause of these terrible phenomena?

A. Those of a superficial kind may have an electric origin: for, when a part of the earth is in a highly electrified state, the approach of a non-electric cloud will produce a sudden discharge, and occasion a violent commotion in the earth, many miles in compass. The principal agent of those that are interior and more tremedous, is subteraneous fire.

Q. Please to explain those of subterraneous origin?

A. The earth abounds with subteraneous caverns, canals, and veins; some full of exhalations; others, full of water; and some parts replete with nitre, sulphur, bitumen, &c. which produce fire: hence, it is easy to conceive the terrible effects which may be occasioned from such confined air or water, *when acted upon* and greatly rarefied by fire; espe-

cially, if it be considered, that the expansive force of steam is twenty-eight times greater than the force of gunpowder.

### OF VOLCANOES.

Q. What are volcanoes?

A. Volcanoes are burning mountains, which emit flame, ashes, cinders, stones, liquid sulphur, and other substances. There are many of them dispersed in all the quarters of the world: the principal of those in Europe, are Etna, or Gibel, in Sicily: Vesuvius, in Naples; and Hecla, in Iceland. It is owing to those vents of subterraneous fires, that the effects of earthquake are not more frequent and dreadful.

### OF THE TIDES.

Q. What are meant by the tides?

A. Two periodical motions of the waters of the sea; called the flux and reflux, or the low and ebb.

Q. Please to explain these motions?

A. The sea is observed to flow from the equator towards the north and the south pole, for about six hours; in which motion, or flux, the sea gradually swells: so that, entering the mouths of rivers, it *drives back the* river waters towards their source.

After a continual flux of six hours, the sea seems to rest for about twelve minutes; and in this state it is called *high water.* When this pause is over, the ebb commences, and the sea retires from the poles to the equator, for six hours more; in which time, the water sinking, the rivers resume their course towards the sea. After this reflux, the sea again rests another twelve minutes; and in this state, it is called *low water.*

Q. How are these phenomena accounted for?

A. They are occasioned by the attraction of the moon; which extends to the earth in so powerful a manner, as to draw up the waters of the ocean in a heap, immediately beneath the moon. At the same time, the waters on the opposite side of the earth, being feebly attracted, the neighbouring waters, pressing towards that place, swell into a heap; pointing to the opposite part of the heaven and causing the tides to rise at the respective antipodes at the same time. Thus, does the moon, in once going round the earth in 24½ hours, produce two tides or swells, and as many ebbs.

Q. What are the causes of the tide rising much higher at one time than at another?

A. The tides are highest about the new and the full moon, and are then called *spring tides:* for, at these times, the action of both the sun and moon are united, and draw in the same straight line; by *which means,* the waters are more elevated; and this

elevation is further increased, the nearer those two luminaries are to the equator; consequently, the highest spring tides are in March and September. The lowest tides are about the first and third quarter of the moon, and are called *neap tides:* for, at these quarters, the sun and moon act contrariwise; the sun raising the waters at the point where the moon causes them to be lowest: so that these tides are occasioned only by the difference by which the attraction of the moon, which is nearest to the earth, prevails over that of the sun.

Q. Whence, proceed their other irregular motions.

A. The tides being caused principally by the moon, they consequently follow her apparent course from east to west, and her declination from north to south; besides the other motions which produce each flux and reflux: and all these motions would happen uniformly, were not the course of the water interrupted by a multitude of islands and continents, which cause a variety of appearances in different places.

## METAPHYSICS.

Q. What are metaphysics?

A. A branch of science more sublime than physics.

Q. *In what,* do these two sciences differ?

A. Physics treats of material or natural things, and judges of them from experience.

Metaphysics is applied to the contemplation of God, angels, and immaterial or spiritual things: and judges of them only by abstraction, independent of material things.

## JURISPRUDENCE

Q. What is jurisprudence?

A. The science of what is just and unjust; or the knowledge of the laws, rights, customs, and ordinances, necessary for the administration of justice.

Q. Whence, is the word jurisprudence derived?

A. It is compounded of the Latin words, *juris*, the genitive case of *jus*, right, and *prudentia*, knowledge or skill.

Q. How are the laws distinguished?

A. Into the law of nature, the law of nations, and civil law.

Q. What is the law of nature?

A. That which nature and reason have taught mankind; as the power it gives to parents over their children.

Q. In what consists the law of nations?

A. In certain rules, sanctioned by all civilized *nations, against* violating hospitality, or encroaching

upon the privileges of ambassadors, &c. sent by one state to another.

Q. What is civil law?

A. Civil law, in professional language, is derived from the ancient statutes of the Romans; but, in a general sense, it i sthe peculiar law of every nation, ordained to provide for the public utility and the necessities of the people, considered as a body corporate. When this respects a city or borough, which enjoys particular privileges, it is called *municipal law.*

Q. Specify the several kinds of law now used in England?

A. They are, first, the *common law;* containing a summary of all the rights and privileges in what is called Magna Charta, or the great charter of England, and a reference to those laws which have been established by ancient usage. 2d, *statute law;* consisting of statutes, acts, and ordinances, of the king and parliament: 3d, *canon law;* a collection of constitutions, decisions, and maxims, for the rule of church government: 4th, *martial* law; used in all military and maratime affairs: 5th, *forest law;* which relates to the regulation of forests and the chase.

Q. What are the laws now prevalent in the United States.

A. Each state is governed by laws framed by its own legislature, and by the common law of England; *the army and* navy being regulated, in particular

cases, by martial law. The laws of congress, also, are binding throughout the Union, in all matters which concern the general welfare, as a nation.

## OF GOVERNMENT.

Q. What is the object of government?

A. The object of government is, or ought to be, the protection of the lives, properties, rights, and privileges, of the people, collectively and individually.

Q. How many kinds of national government are there?

A. Four; monarchial, aristocratical, democratical, or republican, and mixed.

Q. What is monarchial government?

A. Monarchial government is when the supreme authority is in the hands of one person; who is styled a sovereign, emperor, monarch, king, prince &c. Of these, some are *absolute* or *despotic* in their authority; i. e. they have no rule for their conduct, but their *own will*, and are therefore absolute masters of the lives and properties of their subjects: others are *limited;* having their powers strictly defined and restrained by laws.

Q. What is an aristocratical government?

A. It is that wherein the nobles or great men of a *nation exercise* the supreme authority, without

the suffrages of the people. If their numbers be small, it is called an *oligarchy.*

Q. What is a democratical or republican government.

A. It is that wherein the people have the sovereign authority in their own hands; whence, it is delegated, for a given time, to those whom they may choose to appoint as their representatives in congress, parliament, &c. This government, wherein all men, by wisdom and patriotism, may equally aspire to posts of honour and trust among their fellow citizens, as they may aspire to Heaven, by the practise of virtue and piety, is the only true, free, and republican government.

Q. What is to be understood by a mixed government?

A. It is that wherein any two, or all, of the preceding forms, are blended; as, in Great Britain; where the government is a compound of monarchy, aristocracy, and democracy.

The country under a monarch, emperor, king, prince, duke, &c. is called an empire, kingdom, principality, dukedom, &c. but that under an aristocracy or democracy, particularly the latter, is termed a *state*, republic, or commonwealth.

Q. What appears to have been the earliest form of government among men?

A. *Patriarchal:* A kind of government in which

the chief magistrate or ruler sustained the character of *father of his people.*

Q. Into how many branches or departments is government divided?

A. Three: the *Legislative;* whose business it is to make the laws—the *Executive;* by whom the laws are carried into effect. obedience enforced, or transgression punished—the *Judiciary;* whose right it is to explain the laws. determine controversies between man and man, and pronounce sentence of penalty or punishment.

The fundamental laws of a country or state, which secure the rights of the people, and regulate the conduct of their rulers, are termed its constition.

## OF POLITICS.

Q. WHAT are politics?

A. The science of government.

Q. What is necessary to the forming of an able politician?

A. An accurate knowledge of the whole condition of our own, and of every, country; with regard to geographical situation, and government; history, laws, population, productions, and commerce.

## PHYSIC.

Q. WHAT is physic?

A. Physic, or medicine, is the knowledge of those things, by the application of which, the body is either preserved in a healthy state, or restored thereto when disordered.

Q. How is the word physic derived?

A. From a Greek word [*phusis*] signifying *nature;* because medicine consists, principally, in the observation of nature.

Q. What are the principal branches of this science?

A. Anatomy, surgery, pharmacy, chemistry, and botany.

Q. Please to explain their several uses.

A. *Anatomy* is the dissection, or taking to pieces, of the solid parts of the human body; in order to discover their structure and economy, their office and use, and their concern in health or in disease. It is of use, not only in medicine, but also in statuary, and painting.

*Surgery*, or chirurgery, consists in operations performed by the hand; for the cure of wounds, dislocations, fractures, tumours, ulcers, and the like. It has the advantage of medicine, in the solidity of its foundation, the certainty of its operations, and the sensibility of its effects.

*Pharmacy* teaches the choice, preparation, and mixture, of medicines; and consists in the knowledge and management of the several parts of the materia medica, now in the hands of the apothecaries.

*Chemistry* is the art of separating the several substances of which mixed bodies are composed, and of composing other bodies by the mixture of different ingredients: Or,

*Chemistry* is the art of analizing natural bodies, or reducing them to their first principles, and thereby discovering their hidden virtues; with a view to philosophy, physic, and domestic uses.

Q. Is not chemistry, then, a very useful and extensive science?

A. Yes; all bodies contained in the vegetable, as well as in the animal, and mineral, kingdom, come under its notice; and decoctions, infusions, exhalations, calcinations, distillations, crystallizations, elixirs, tinctures, &c. are the results of its operations.

*Botany* is that *science* which treats of plants, with their varieties, forms, virtues, and uses in medicine and other affairs of life.

Q. You mentioned the vegetable, animal, and mineral kingdoms: what are they?

A. Naturalists, in order to give some arrangement to the numerous objects claiming their attention, have divided the productions of this globe

into three great classes, which they denominate the three kingdoms of nature:

1. The *vegetable kingdom:* comprehending whatever vegetates, or grows out of the earth; having root, stem, or leaf, flower, fruit, or seed.

2. The *animal kingdom: embracing* all organized beings; possessing life, sensation, and the power of motion. And,

3. The *mineral kingdom:* comprehending all bodies destitute of animal or vegetable life; which are thus classed. 1. Earths and stones; 2. salts; 3. inflammables; and 4. metallic substances or ores.

This last branch of natural history is called—

## MINERALOGY.

Q. What is to be understood by this branch of science?

A. It regards all fossil bodies: as gold, silver, iron, tin, lead, and coal; besides the various kinds of stone: as marble, diamonds, the loadstone, &c.

Q. Give a short description of the principal metals.

A. Gold is the purest, most ductile, and the heaviest of all metals, except platina. It is found in mines, in various parts of the world; but abounds most in the mines of Peru and Chili, in South America.

2. *Silver* is a white metal; heavy, sonorous, brilliant, and very ductile. It is found in the greatest abundance in South America.

3. *Copper* is of a red colour; very sonorous and elastic, and the most ductile of all the metals, except gold. It is found in various parts of the world; but particularly in Sweden.*

4. *Iron* is universally and largely diffused throughout nature; pervading almost every thing: being the chief cause of colour in earths and stones, and existing in vegetables and animal fluids.

Though the cheapest, it is by far the most useful of all metals.

When placed for some time in contact with red-hot charcoal, it becomes much harder and more elastic; and is then called steel: and when suspended perpendicularly for a considerable period, or acted on by intense friction, it acquires the property of the magnet.

5. *Lead* is very heavy; of a livid white colour, and the softest of all metals. It is extensively used in making paints; producing grey, white, red, or brown, according to the quantity of oxygen with which it is brought in contact. It is found in the greatest abundance in England.

* A mixture of copper and tin forms *bronze:* two parts of copper and one of zinc, form *brass:* other proportions *make princes metal.*

6. *Tin* is a white, fusible metal, neither so hard as silver, nor so soft as lead. The tin mines in Cornwall and Devonshire (England) furnish the greatest part of all the tin consumed in Europe.*

7. *Mercury or quicksilver* is a fluid matter, resembling melted silver.

In the temperature of our atmosphere, it is neither ductile nor malleable. It is the heaviest of all metals, gold and platina excepted; is in a high degree volatile, and extremely fluid; easily adheres to gold, less readily to silver, with difficulty to copper, but to iron not at all.

Q. What of the diamond, and other precious stones?

A. The diamond, called by the ancients, adamant, is the most valuable of all the precious stones. Its goodness consists in its water or colour, lustre and weight. It is found chiefly in the mines of Golconda in Hindoostan, is the hardest of all gems, and can be cut only by itself.

The *ruby* is next to the diamond in value, and is of a crimson colour, inclining to purple.

The *garnet* is very like the ruby, and perhaps is of the same species.

The *hyacinth* is sometimes of a deep red, and sometimes of a yellow, colour.

* Six pounds of brass, with fifteen pounds of lead, and a hundred pounds of tin, make the composition called pewter.

The *emerald* is a grass green.

The *beryl*, a sea, or bluish, green.

The *sapphire*, a sky blue.

The *topaz* or *chrysolite* is of a gold colour.

All these are transparent; but the *cornelian*, which is of a pale red or orange colour; the *onyx*, of a grayish cast; the *turquoise*, between a blue and a green; and the *lapis lazuli*, which is studded with spots of gold on an azure ground; are opaque, or only half transparent.

Q. What do you know of the magnet or loadstone?

A. That it is found in iron mines in several parts of the world: as, China, Arabia, Bengal, Hungary, Germany, and England; and that it resembles the ore of iron in appearance, but is closer and more ponderous. It powerfully attracts iron, to which it also communicates the same attractive power; and every magnet, however small or divided, has two poles, one of which points to the north and the other to the south. The discovery of the virtues of this stone is of the highest importance to navigation and commerce.

## RHETORIC AND ORATORY.

Q. What is meant by rhetoric?

A. Rhetoric, or oratory, is the art of speaking justly, methodically, and elegantly, upon any subject; so as to instruct, persuade, and please. A speech made according to the rules of this art, is called an *Oration*, and the speaker an *Orator*.

Q. Whence, is the word rhetoric derived?

A. From a Greek word [rhetoriche] of the same signification.

Q. What are the qualifications requisite for excelling in this art?

A. A good orator must be eminent for invention, disposition, memory, gesture, and elocution.

Q. Please to explain the purport of each.

A. *Invention* is the talent of forming, or selecting, such arguments, for the proving or illustrating of a subject, as will move the passions, and conciliate or instruct the minds of the hearers.

*Disposition* is the arrangement of the arguments, in the most orderly and advantageous manner.

*Gesture* is the natural, or the artificial, accommodation of the attitude to the several parts of a discourse;—the "suiting of the action to the word."

*Elocution* is the art of expressing our ideas in a clear and distinct manner, and in harmonious, appropriate language.*

Q. How many parts has an oration?

A. Five; the exordium, narration, confirmation, refutation, and peroration.

Q. Explain each of these.

A. The *exordium*, or preamble, is the beginning of the discourse; serving to gain the good opinion of the hearers; to secure their attention, and to give them a general notion of the subject. It ought to be clear, modest, and not too prolix.

The *narration* is a recital of the facts as they happened; or, as they are supposed to have happened. It ought to be perspicuous, probable, concise, and (on most subjects) entertaining.

* *Elocution* comprises,

1st. *Composition* or the grammatical arrangement, plainness, and propriety of language.

2d. *Elegance;* which consists in the purity, perspicuity, and politeness of language, and is gained chiefly by studying the most correct writers, conversing with polite, well informed people, and making frequent and careful essays in composition.

3d. *Dignity;* which adorns language with sublime thoughts, rhetorical figures, &c.

The *confirmation* is the proving by argument, example, or authority, the truth of the propositions advanced in the narration.*

The *refutation*, or confutation, is the destroying of the arguments of the antagonist; by denying what is apparently false, detecting some flaw in the reasoning, or showing the invalidity of the proof. It should be sharp and lively.

The *peroration*, or conclusion, is a recapitulation of the principal arguments, concisely summed up with new force and weight; in order to excite the feeling of hatred or pity.

Q. What are Tropes or figures of speech?

A. Tropes or figures of speech always denote some departure from simplicity of expression: they enunciate, after a particular manner, the idea we intend to convey, with the addition of some circumstances designed to render the impression more strong and vivid. When I say, "A good man enjoys comfort in the midst of adversity"—I express my thoughts in the simplest manner possible. But when I say, "To the upright, there ariseth light, in darkness,"—the same sentiment is expressed in a figurative style; a new circumstance is introduced; light is put in the place of comfort, and darkness for adversity.

* Rhetoricians advise us to place our strongest arguments in the front, the weakest in the middle, and to reserve some of the best till the close.

Q. Describe to me the principal of those figures.

A. Personification, by a bold effort of the imagination, bestows sensibility and voluntary motion upon things inanimate.

Examples:

*Ye Woods and Wilds, whose melancholy gloom*
*Accords with my soul's sadness, and draws forth*
*The voice of sorrow from my bursting heart,*
*Farewell, awhile, &c.* Home.

*Cheer'd with the grateful smell, old Ocean smiles.*
Milton.

*But look, the Morn, in russet mantle clad,*
*Walks o'er the dew of yon high eastern hill.*
Shakesp.

*At his command, the uprooted Hills retir'd,*
*Each to his place: they heard his voice, and went*
*Obsequious: Heaven his wonted face renew'd,*
*And, with fresh flowrets, Hill and Valley smil'd.*

Q. What is Apostrophè?

A. *Apostrophè* is a figure nearly allied to personification. It consists in bestowing an ideal presence upon real persons, either dead or absent. *We address them as if they stood before us listening to the overflow* of our passions.

Example:

*Weep, on the rocks of roaring winds, O maid of Inistore; bend thy fair head over the waves, thou fairer than the ghost of the hills, when it moves in a sun-beam, at noon, over the silence of Morven. He is fallen! Thy youth is low; pale, beneath the sword of Cuchullin.*

Ossian.

*Retire; for it is night, my love, and the dark winds sigh in thy hair. Retire to the hall of my feasts, and think of the times that are past; for I will not return till the storm of war is gone.*

Ossian.

Q. In what, does the Hyperbolè consist?

A. The Hyperbolè consists in magnifying or diminishing an object beyond reality.

Hyperbolè soars high, or creeps too low;
Exceeds the truth, things wonderful to show.
*He touch'd the skies. A snail don't crawl so slow.*

Examples:

*——I found her on the floor,*
*In all the storm of grief; yet beautiful;*
*Pouring forth tears,* at such a lavish rate,

*That, were the world on fire, they might have drown'd*
*The wrath of heaven, and quenched the mighty ruin.* Lee.

(Combined with person.)

*The mountains and the hills shall break forth before you into singing, and all the trees of the field shall clap their hands.*

Isaiah.

*"He was owner of a piece of ground not larger than a Lacedemonian letter."*

Q. What is a Similè?

A. A Similè is a comparison, by which any thing is illustrated.

This figure, equally familiar and beautiful, discovers resemblances, real or imaginary, between objects or actions, which, in their general nature, are dissimilar.

Examples:

*The music of Caryl was, like the memory of joys that are past, pleasant and mournful to the soul.*

*Often, like the evening sun, comes the memory of former times on my soul.*

Ossian.

As the bee, in quest of honey; so, wanders the nius of our Bard, in quest of poetical decoration,

*She never told her love;*
*But let concealment, like a worm i' th' bud,*
*Feed on her damask cheek: she pin'd in thought;*
*And, with a green and yellow melancholy,*
*She sat like patience on a monument, smiling at grief.* Shakesp.

Q. What is a Metaphor?*
A. A Metaphor is the putting of the name of one ng for that of another; so as to comprise a similè a single word: or,
t is the application of a word to a use, to which, s original import, it cannot be put: as,

*Wallace* was a *thunderbolt* of war;
*Fingal*, the *gale* of spring.

A metaphor, in borrowed words, compares;
Thus, for excess, we say, a flood of tears.

A hero resembles a lion, and is often compared ne. Such a comparison is a similè: but ima- e the hero to be a lion, instead of only resem- g one, and you have a metaphor.

A *metaphor* differs from a similè in form only, not in ance: *comparison* is the foundation of both.

"Like a mighty pillar, doth this one man uphold the state." [This is a simile.] "He is the solar of this ponderous state." [A metaphor.]

Another example.

*But yonder comes the powerful king of day,*
*Rejoicing in the east.*

Thomson.

*O! when the growling winds contend, and all*
*The sounding forest fluctuates in the storm,*
*To sink in warm repose, and hear the din*
*Howl o'er the steady battlements!*

Q. What is an Allegory?

A. An Allegory is a continued metaphor;—or, it is the representation of one thing by another, that resembles it, and that is made to stand for it.

Examples:

*Venus grows cold without Ceres and Bacchus;*
i. e. Love grows cold without bread and wine.

*Did I but purpose to embark with thee,*
*On the smooth surface of a summer's sea,*
*Where gentle zephyrs play with prosperous gales,*
*And fortune's favour* fills the swelling sails;

*would forsake the ship and make the shore,*
*en the winds whistle, and the tempests roar;*
*n, &c.*

Prior.

here cannot be a more beautiful and correct
gory than the following; in which the people
srael are represented under the image of a
.

Thou hast brought a vine out of Egypt; thou
t cast out the heathen, and planted it: thou pre-
edst room before it, and didst cause it to take
p root, and it filled the land.
he hills were covered with the shadow of it,
the boughs thereof were like the goodly cedars.
he sent out her boughs unto the sea, and her
nches unto the river.
Vhy hast thou, then, broken down her hedges, so
t all they who pass by the way do pluck her?
The boar out of the wood do waste it, and the
d beasts of the field doth devour it.
Return, we beseech thee, O God of hosts; look
vn from heaven, and behold, and visit this vine."

80th Psalm.

Q. What is Irony?
A. Irony, dissembling with an air,
*Means otherwise* than words declare.

Example:

"*Cry aloud; for he is a God: either he is talking or he is pursuing, or he is in a journey, or peradventure he sleepeth, and must be awakened.*"

I Kings xviii. 27.

Q. What is a Climax?

A. A Climax, by gradation, ascends.

Examples:

"*They were my countrymen, my neighbours, friends.*"

"*France, amidst the ferocity of successive factions; unaided by a single friend; assailed, on all sides, by the strongest energies of the surrounding kingdoms; preserved her territory uninjured.*"

Grimshaw's History of England.

Q. What is Metonymy?

A. Metonomy is founded on the several relations of cause and effect; container and contained; sign and thing signified.

When we say, "They read Milton," we mean Milton's *works;* and when we say, "The kettle boils," we allude to the *water* in the kettle.

Q. *What is* Synecdoche?

A. Synecdoche the whole for part doth take,
Or part for whole (just for the metre's sake.)

Examples:

"*While o'er the roof,* [house] *loud thunders break.*"

"*By the sweat of his brow, earns he his bread,*" [food, clothing, &c.]

## GRAMMAR.

Q. WHAT is Grammar?

A. The art of rightly expressing our thoughts, by words, in discourse or writing.

Q. Whence, is the word grammar derived?

A. From the Greek word [gramma] which signifies a letter.

Q. How is grammar divided?

A. Into four parts: etymology, orthography, syntax, and prosody.

Etymology deduces and explains the origin, reason, and derivation, of words; in order to arrive at their first and primary signification.

Orthography, or spelling, teaches to write words with all the proper and necessary letters.

Syntax is the constructing or right ordering of words in a phrase or sentence; so as to make the *meaning clear and* distinct.

Prosody treats of the true pronunciation of syllables, in respect to quantity and accent.

Q. What are meant by quantity and accent?

A. Quantity is the length of time taken up in pronouncing a syllable; and accent, the pronouncing of it with a stronger or a weaker tone, of voice.

Q. How many kinds of words are there?

A. Nine; commonly called parts of speech.

Q. What are their names?

A. The article, noun, pronoun, verb, participle, adverb, preposition, conjunction, and interjection.

Q. Is it necessary to study the grammar of our own language?

A. Most certainly it is: for, without a competent grammatical knowledge of our own language, we should be ignorant of its beauties, and unable to express ourselves correctly, or politely, even on the most trifling occasions.

## LANGUAGE.

Q. WHAT is language?

A. A set of words, or an assemblage of expressions, which chance or caprice has established among a people, in order to communicate their thoughts to each other.

Q. Whence, the origin of language?

A. It is supposed to be of Divine origin, and *supernaturally* communicated to the first man.

Q. Whence, comes the diversity of languages?

A. It is generally allowed to have taken its rise from the confusion of tongues at the building of the Tower of Babel.

Q. Where, may an account of this event be seen; and by whom is it given?

A. In the 11th chapter of Genesis, written by Moses.

Q. What language is the most ancient?

A. This point has been much controverted. The majority seem inclined to the Hebrew; deeming it the primitive language, and the source of all the rest: the Syriac has the next greatest number of advocates; but many support the Greek; others maintain the Teutonic; and some, the Chinese.

Q. What are the principal languages now in use in Europe and America?

A. The English, French, German, Spanish, and Italian.

The first of these, the root of which is chiefly Saxon, enriched by derivations from the Latin, and by familiar phrases from the French, with occasional formations from the Greek language, is not excelled by any other, for copiousness and strength. The French tongue is extremely brisk and lively; composed of ancient Gallic words, and, like the English, largely indebted to the Latin. The German has a variety of dialects; principally of Celtic origin. *The Italian is* almost wholly an alteration of the

Latin; and the Spanish language plainly discovers itself to be of the same family.

Q. Who was the inventor of letters?

A. There being no authentic relation of any alphabetical character before the flood, the greater number of writers have contented themselves with tracing their origin to Moses; who is supposed to be the same with the Egyptian Thoth or Hermes.

Q. Who composed that orderly arrangement of the letters, called the alphabet?

A. It is generally ascribed to Cadmus, king of Thebes: he first brought letters from Phenicia into Greece, about 1945 years before Christ; whence, in the following ages, they spread over the rest of Europe.

## POETRY.

Q. What is Poetry?

A. It is a species of compositon, made according to certain harmonious measures, or proportions of time and sound.

Q. What is a poem?

A. A complete or finished piece of poetry; as Homer's Iliad.

Q. What is rhyme?

A. Rhyme is that kind of poetry in which the *terminating* sound of one line, agrees with that of *another*; as,

Go, tell my son, said she,
All thou hast heard of me.

Q. What is blank verse?

A. Blank verse, like other poetry, is measured, but does not rhyme; as:

Night, sable goddes! from her ebon throne,
In rayless majesty, now stretches forth
Her leaden sceptre o'er a slumb'ring world.
Silence, how dead! and darkness, how profound!
Nor eye, nor listning ear, an object finds:
Creation sleeps.

YOUNG.

Q. What is meant by the term *measure*, in poetry?

A. The number of syllables, or of feet, contained in a line.

Q. What measures are most in use?

A. Those of ten, eight, and seven syllables.

Q. Give an example of each?

*Of ten.*

The bending Hermit here a pray'r begun—
"Lord, as in heav'n, on earth thy will be done."
Then, gladly turning, sought his ancient place,
And pass'd a life of piety and peace.

PARNELL.

*Of eight.*

The woodbine wafts in odours meek,
To kiss the rose's glowing cheek;
Pale twilight sheds her vagrant show'rs,
T' awake Aurora's infant flow'rs:
May smiles on ev'ry face I see,
But ah! she smiles no more on me!

MRS. ROBINSON.

*Of seven.*

Oh then, e'er the turf or tomb
Cover us from ev'ry eye;
Spirit of instruction, come,
Make us learn that we must die!

Cowper.

Q. Are there any other measures?

A. Yes; there are several other shorter measures in use, but they are not so common.

Q. What is pastoral poetry?

A. It is that which describes a shepherd's life, or the life of rural nymphs and swains.

Q. What is an elegy?

A. A mournful poem, or funeral song.

Q. What is lyric poetry?

A. It is that which is generally used in the composition of odes and songs, designed to be sung to the lyre or harp.

Q. What is Pindaric ode?

A. Pindaric ode, so called from its inventor, Pindar, is a sort of poetry, which consists of loose and free numbers, of unequal measures.

Q. What is Satire?

A. Satire is a free, witty, sharp, and jocose, poem; severely reproving the vices and follies of those in whom they are found.

Q. What is Comedy?

A. Comedy is an ageeable, humorous representation, of the customs of common life.

Q. What is Tragedy?

A. Tragedy exhibits the actions of virtuous and illustrious persons; so as to excite sympathy, or promote the patriotic, heroic and social virtues.

Tragedy and comedy are called dramatic poetry.

Q. What is an epic or heroic poem?

A. It is a poetical narration or rehearsal, of the illustrious and important actions of the person celebrated in the poem; as, the exploits of Achilles, in the Iliad of Homer.

Q. An Epigram—what is that?

A. An epigram is an inferior kind of poem; whose peculiar character is brevity, beauty, and a sharp turn of wit at the close.

Q. What is an acrostic—a rondeau—a charade—echo—rebus, &c.

A. They are a trifling kind of productions, not worth a description here.

Q. What is a poetical foot—and why so called?

A. A certain number of syllables, connected, form a foot. They are called feet, because it is by their aid that the voice, as it were, steps along through the verse in a measured pace: and it is necessary that the syllables which mark this regular movement of the voice, should, in some way, be distinguished from the others.

Q. How many kinds of these feet are there?

A. They are all reducible to eight kinds; four of two syllables, and four of three; viz.

| | |
|---|---|
| A Trochee – ⏑ | A Dactyl – ⏑ ⏑ |
| An Iambus ⏑ – | An Amphibrach ⏑ – ⏑ |
| A Spondee – – | An Anapœst ⏑ ⏑ – |
| A Pyrrhic ⏑ ⏑ | A Tribrach ⏑ ⏑ ⏑ |

Q. How are these several kinds of feet ditinguished?

A. *Trochee* has the first syllable accented, and the last unaccented; as, hāteful, pĕttish.

An *Iambus* has the first syllable unaccented, and the last accented; as, bĕtrāy, consĭst.

A *Spondee* has both the words or syllables accented; as, the pāle mōōn.

A *Pyrrhic* has both the words or syllables unaccented; as, ŏn thĕ tall tree.

A *Dactyl* has the first syllable accented, and the last two unaccented; as, lăbŏurĕr, póssible.

An *Amphibrach* has the first and last syllables unaccented, and the middle one accented; as, dĕlightfŭl, domèstic.

An *Anapæst* has the first two syllables unaccented, and the last one accented; as, cŏntrăvēne, acquiésce.

A *Tribrach* has all its syllables unaccented; as, nūmĕrăblĕ, cónquerable.*

Q. Is there any advantage to be derived from understanding these feet?

A. Yes; an acquaintance with them enables those who read poetry, to judge of its correctness, to relish its beauties, and to read it, in the hearing of others, with more propriety and effect.

Give an example or two of Iambic verse.

And māy ăt lăst my weāry āge
Find out a peaceful hermitage.

* Some of those feet may be denominated principal ones; as pieces of poetry may be wholly or chiefly formed of any of them. Such are the Iambus, Trochee, Dactyl, and Anapæst. These may also be divided, each into several species; according to the number of feet or syllables of which they are composed: They are capable also of numerous variations, by intermixing them, and by the admission of the secondary feet. The Spondee, Pyrrhic, Amphibrach, and Tribrach, are secondary feet.

Hŏw lōv'd, hŏw vālŭ'd ōnce, ăvāils thĕe nŏt,
To whom related, or by whom begot:
A heap of dust alone remains of thee;
'Tis all thou art, and all the proud shall be.

Bĕ wīse tŏ dāy; 'tĭs mādnĕss tō dĕfēr;
Next day the fatal precedent will plead;
Thus on, till wisdom is push'd out of life.

*Give an example of Trochaic verse.*

Rēstlĕss mōrtăls tōil fŏr nōught;
Bliss in vain from earth is sought;
Bliss, a native of the sky,
Never wanders. Mortals, try;
There, you cannot seek in vain;
For, to seek her, is to gain.

Ĭdlĕ āftĕr dĭnnĕr ĭn hĭs chāir,
Sat a farmer, ruddy, fat and fair.

*Give an example of Dactylic measure.*

Frōm thē lŏw pleāsŭres ŏf thĭs fălln nātŭre,
Rise we to higher, &c.

*Give an example of Anapæst verse.*

Ŏ yĕ wōods, spрĕad yŏur brānchĕs ăpāce,
To your deepest recesses I fly;

I would hide with the beasts of the chase;
I would vanish from every eye.

Măy I gŏvĕrn my pāssĭŏns wĭth ābsŏlūte swāy,
And grow wiser and better as life wears away.

Q. How many kinds of poetical pauses are there?

A. Two—one for the sense, and one for the melody; perfectly distinct from each other. The former is called the *sentential pause;* and the latter, the *harmonic pause.*

The sentential pauses are those which are known to us by the name of stops; as, comma, semicolon, &c.

Q. What have you to remark respecting the harmonic pause?

A. The harmonic pauses may be subdivided into the *final* pause, and the *cæsural* pause. These sometimes coincide with the sentential pause, and sometimes have an independant state; that is, exist where there is no stop in the sense.

Q. Where, in reading poetry, is the *final*, and where, the *cæsural* pause, to be made?

A. The final pause takes place at the end of the line, closes the verse, and marks the measure: the cæsural pause divides the line into equal, or unequal parts, falling generally on the 4th, 5th, or 6th syllable, in heroic verse. The final pause preserves the *melody, without* interfering with the sense; for, as

it has no peculiar note of its own, but always takes that which belongs to the preceding word, it changes with the matter and varies with the sense; thus, preventing monotony.

Exemplification of the cæsural pauses: ["].

*The silver eel", in shining volumes roll'd,*
*The yellow carp", in scales bedropp'd with gold.*

*Round broken columns", clasping ivy twin'd,*
*O'er heaps of ruin", stalk'd the stately hind.*

*Oh, say, what stranger cause", yet unexplor'd,*
*Could make a gentle belle" reject a lord.*

The line is sometimes divided into four parts, by the introduction of what is called a demi-cæsura; thus:

*Warms' in the sun", refreshes' in the breeze,*
*Glows' in the stars", and blossoms' in the trees;*
*Lives' through all life", extends' through all extent.*
*Spreads', undivided", operates', unspent.*

## MUSIC

Q. In what, does Music consist?

A. It consists in a succession of pleasing sounds; with reference to a particular, internal sense, implanted in us by the Great Author of Nature.

Q. What does music teach, considered as a science?

A. Considered as a *science*, music teaches us the just disposition and true relation of sounds; so that they may affect us in the most agreeable manner: As an *art*, it enables us to express these sounds with facility and correctness.

Q What is to be understood by the composition of music?

A. It is the act of framing pieces of music, and writing them in notes, upon paper; according to the rules of the science.

Q. How many sounds may be expressed by the human voice?

A. Ordinarily, twenty-two.

Q. What is melody?

A. Melody is the agreeable effect which arises from the succession of single sounds.

Q. What is harmony?

A. Harmony is the pleasing union of several sounds.

Q. What are the principal qualities of musical sounds?

A. The primary and essential qualities of musical sounds are, *relative acuteness or gravity*, and *proportionate duration*.

Bodies of unequal *size, length*, or *tension*, emit sounds differing both in duration and in gravity or *acuteness*. *Thus*, in a set of regularly tuned bells,

the largest gives the *gravest* sound, and the smallest, the most *acute*. Human voices also differ in this respect; a man's voice being more grave than that of a woman.

Q. Whence, is the word music derived?

A. It is supposed to have been originally formed from the Latin word, *musa*, muse; the Muses being considered as its inventors.

Q. Had not music a very early origin?

A. It appears to have been among the most ancient of the arts; and, of all arts, vocal music must, undoubtedly, have been the first kind: for, man had not only the various tones of his own voice on which to make his observations, before any other art, or any instrument, was found out, but had the various natural strains of birds to give him occasion to improve his own voice, and the modulations of sound it was capable of expressing.

Q. How are the various musical instruments supposed to have been invented?

A. The first invention of wind instruments is ascribed to the observation of the wind whistling in the hollow reeds. As for other kinds of instruments, there were so many occasions for using cords or strings, that men could not fail to observe their various sounds; this may have given rise to stringed instruments: and for the pulsatile instruments, as drums, cymbals, &c. they may have arisen from the *observation of* the naturally hollow sounds of *concave bodies.*

Q. Is not music in great repute?

A. It has been in the highest esteem, in all ages, and among all people. Authors could not express their opinion of it sufficiently strong except by inculcating that it was used in heaven, and was one of the principal entertainments of the gods and the souls of the blessed.

Q. What are the effects of music?

A. It not only delightfully recreates the mind, and gives it new vigour for business, but, by it, diseases are said to have been cured, seditions quelled, passions raised and calmed, and even madness occasioned.

## MATHEMATICS.

Q. WHAT are mathematics?

A. A science that contemplates whatever is capable of being numbered or measured.

Q. What is the etymology of the word?

A. It is derived from the Greek; and the original word signifies *discipline* or *science;* for, this is the eldest science, and the rest took their common name from it.

Q. How are mathematics divided?

A. Into pure and mixed: the *pure* considers quantity, abstractedly, and without any relation to matter or bodies; the *mixed* are interwoven with *physical considerations.*

Q. Of what use, is this science?

A. It opens and extends our ideas, strengthens and improves our understanding, fixes our attention, and, by giving a habit of just reasoning, prepares us for all other kinds of study, and every important employment of life.

Q. What are its principal branches?

A. Arithmetic, geometry, mechanics, optics, astronomy, geography, chronology, and architecture.

## ARITHMETIC.

Q. What is Arithmetic?

A. It is the science or knowledge of numbers, and has five principal rules for its operations; namely; numeration, addition, substraction, multiplication, and division.

Q. What does numeration teach?

A. To read or express the true value of any number of figures, written down, or named.

Q. What does addition teach?

A. Addition teaches to collect several numbers or quantities into one sum; as, 7 and 5 are 12, and 8 are 20.

Q. What does substraction teach?

A. It teaches to take a less number from a greater, and shows the remainder or difference.

*Q. What does* multiplication teach?

A. It teaches to find a number, a proposed number of times; so that it is a compendious kind of addition.

Q. What is division?

A. It is the reverse of multiplication, and shows how often one number is contained in another.

Reduction, the rule of three, practice, interest, fellowship, the extraction of roots, &c. are no more than so many combinations of those five elementary rules.

Q. To whom, is arithmetic necessary?

A. A knowledge of arithmetic is necessary to every one. It is the soul of commerce, and essentially necessary in every department of life.

## OF COMMERCE.

Q. What is Commerce?

A. It is the exchanging of one thing for another; or the buying and selling of merchandise, with a view of acquiring profit. It appears to be nearly as ancient as the world; and at first consisted simply in exchanging things necessary for life. This is, even now, the state of commerce amongst the people on the coast of Siberia; in Russian and Norwegian Lapland; and with many of the Asiatic and African tribes, as well as those of America. *Money was not,* at a very early period, known;

nor is it now in use, as a medium of trade, ar the people here mentioned.

Q. What nations have made themselve famous in commerce?

A. The Phenicians, Egyptians, Carthag and Rhodians; and, in modern times, the Fle Venetians, Genoese, Portuguese, and Dutc especially the British, and Americans.

The famous society of the Hanseatic T joined in a league, offensive and defensive, i monly believed to have been instituted at Br It was not, in the beginning, composed of than the towns situated on the Baltic sea, those that were only a little distant; but, i putation increasing, there were few of the co cial towns in Europe that were not of the n Immediately before the great French revoluti comprised Lubeck, Hamburgh, Bremen, Ro Brunswick, and a few others; but is now, a as many other ancient associations, totally d ed.

## GEOMETRY.

Q. What is Geometry?

A. A science teaching the mensuration of tity, extension, and magnitude; that is, of *surfaces, and* solids.

The word is from the Greek, and signifies *to measure the earth.* It had its rise among the Egyptians; who were, in a manner, compelled to invent it, to remedy the disorders occasioned by the annual inundations of the river Nile, which bore away the bounds and landmarks of their estates.

Q. What is a line?

A. A line is length only, having neither breadth nor thickness. It is supposed to be formed by the motion of a point; and is to be conceived as the limit of a surface, and not as a part of that surface, however small.

Q. What is a surface?

A. A surface or superficies, is a magnitude, extending in length and breadth, but without thickness or depth. It is produced by the motion of a line; and is chiefly considered as the external part of a solid.

Q. What is a solid?

A. A magnitude, endued with three dimensions, or extended in length, breadth, and depth. It is terminated, or contained, under one or more planes or surfaces, as a surface is under one or more lines.

Q. How is geometry divided?

A. Into four principal branches; altimetry, longimetry, planimetry, and stereometry.

*Q. Explain the* purport of each.

the weight drawn up by a rope winding round the axle.

The *pulley*, is a little wheel or rundle; having a channel round it, and turning on an axis, and a rope which rests on its channel; has the power applied at one end, and the weight, at the other. An assemblage of these is called a system of pulleys some of which are in a block, which is fixed; and others in a block, which is moveable, and rises with the weight.

An *inclined plane* is like the chamfered part of an edgetool, which is ground down only on one side, to the edge.

A *wedge*, in the common form, is like two inclined planes, joined together at their bases.

The *screw* may be considered as an inclined plane, wrapped round a cylinder, which is turned by a winch or lever: it is of great efficacy in raising weights, or in pressing bodies closely together.

Of these six simple machines, all the most compound engines in the world consist. As the screw includes the inclined plane, and two inclined planes make the wedge, we have all the mechanical powers combined in a common *jack*, if it be aided by a fly-wheel; for, then, we have also the lever, the wheel and axle, and the pulleys.

Q. What are optics?

A. A science explaining the nature and laws of vision: whether natural, as performed by the eye; or, artificial, as effected by instruments.

Q. How is vision produced?

A. Vision, or the act of seeing by the eye, is performed by rays of light, reflected from an object, and received in at the pupil; which rays are refracted in their passage through the coats and humours to the retina, and being thence conveyed, by the optic nerve, to the common sensorium in the brain, the luminous object is perceived by the mind.

Q. What are the other benefits of this science?

A. Besides explaining the manner in which vision is performed in the eye, it treats of sight, in general; explains the several modifications which the rays of light undergo in the eye, and why some can only see a short, and others a greater, distance; shows why objects appear sometimes greater, and sometimes smaller; sometimes distinct, and sometimes confused; sometimes near, and sometimes remote: and accounts for the production of light, colours, &c. All the rules of perspective have their foundation in optics.

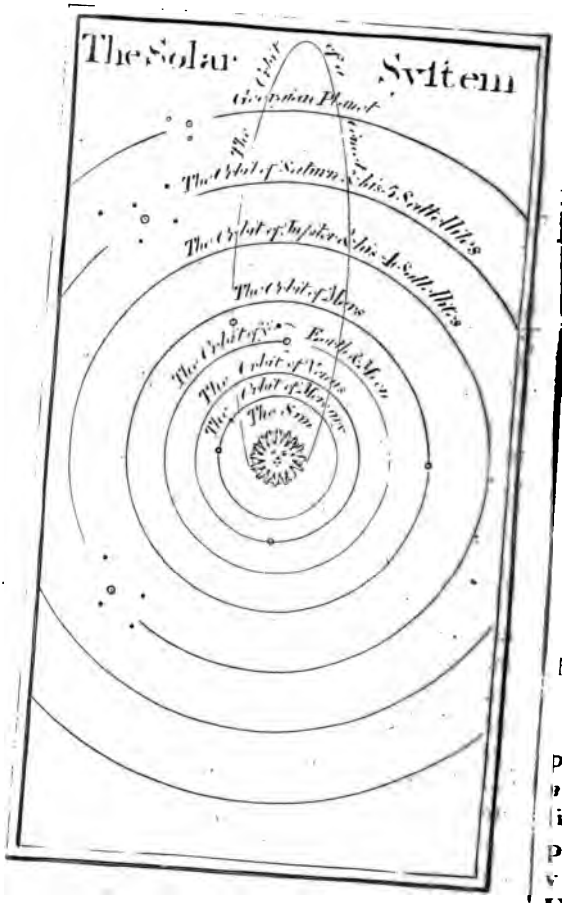
## ASTRONOMY.

Q. What is Astronomy?

A. A mixed mathematical science; teaching the knowledge of the celestial bodies, their magnitudes, motions, distances, periods, eclipses, and order.

Q. What is the use of this science?

A. By knowledge derived from astronomy, not only the size of the earth is discovered, the situation of countries ascertained, trade and commerce carried on to the remotest parts of the world, and its various products distributed for the health and comfort of mankind; but, our very faculties are enlarged with the grandeur of the ideas it conveys; our minds, exalted, above the low-contracted prejudices of the vulgar; and our understandings, convinced of the existence, power, and goodness, of the Supreme Being; who carries on the wonderful harmony and connexion observable throughout the solar system.


The Solar System
The Orbit of the Georgian Planet
The Orbit of Saturn
The Orbit of Jupiter
The Orbit of Mars
The Orbit of the Earth
The Orbit of Venus
The Orbit of Mercury
The Sun

*Of the Solar System.*

Q. What is understood by the solar system?

A. The sun, with the planets and comets which move round him as their centre.

Q. Give some particulars of the Sun?

A. The Sun, an immense globe of fire, is fixed in the centre of the system, having a central motion only about his own axis, in 25 days 6 hours; as is evident by observing the black spots seen on his disk or surface. He is about 763,000 miles in diameter; is nearly one million of times larger than the earth; and dispenses light and heat to all the planets and comets revolving round him.

Q. What are the planets?

A. They are opaque, spherical bodies; having no light of their own, but shining by the reflected light which they receive from the Sun. That side of them, only, is illuminated, which is turned towards him.

Q. How many planets revolve round the Sun?

A. Seven: Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and Herschel. These are called *primary planets;* four of which are attended by satellites or moons, called *secondary planets;* which respect the primary as their centre of motion, and revolve round them as the primary do round the Sun. *Each primary planet* describes a large orbit, nearly

circular, around the middle, or equatorial pa
the sun; and, besides this revolution, each h
tation, or central motion, on its axis: and bot
motions, in all the planets, are made in th
way; from west to east.

Q. Have not these two motions some pa
denomination.

A. Yes; the revolution of a planet in its o
called its *annual*, or *yearly*, *motion:* because
all the alterations of the seasons, and the va
of the year, completed in the course of that r
tion. The rotation of a planet on its axis, is
its *diurnal*, or *daily*, *motion:* because, by this r
each part of its surface is carried, successive
wards, and from, the Sun; which illuminate
half next him, making it day; while the oth
mains in darkness, which constitutes night.

Q. What particulars have you to mentior
cerning each of the planets?

A. *Mercury* is the nearest planet to the Su
goes round him in 87 days 23 hours of our
nearly; which is the length of his year; but
seldom seen, on account of his proximity to the
and no spots appearing on his surface, the ti
his rotation on his axis, or the length of his d
unknown. His distance from the Sun is com
to be 37 million of miles; his diameter, 3200;
*in his course* round the Sun, he moves at the r
*105,000 miles* every hour.

*Venus*, the next planet in order, is computed to be 68 million of miles from the Sun. By moving at the rate of 76,000 miles every hour in her orbit, she completes her annual revolution in 224 days 17 hours. Her diameter is 7700 miles, and her diurnal rotation is performed in 24 of our days, nearly. When she appears to the west of the Sun, she rises before him, and is called the Morning-star; and when to the east of the Sun, she shines after he is set, and is then called the Evening-star. Mercury and Venus, viewed through a telescope, exhibit, during the whole of their revolutions, all the variety of shape and appearance observable in the Moon; which is a proof that their orbits are included within the orbit of the Earth; and, hence, they are called *inferior planets.*

The *Earth* is the next planet beyond Venus; at the distance of more than 95 million of miles from the sun. It completes its annual circuit in 365 days 5 hours 49 minutes; moving at the rate of 58,000 miles every hour: which motion, though 120 times swifter than that of a cannon-ball, is little more than half the velocity of Mercury in his orbit. The Earth's diameter is 7970 miles. By turning round its axis, every 24 hours, from west to east, it causes an apparent diurnal motion of all the heavenly bodies, from east to west. This planet is attended by a satellite, or secondary planet, called *the Moon:* which respects the earth as the centre

of its motion; going round the earth, from change to change, in 29 days, 12 hours, 44 minutes; and accompanying it around the Sun every year. The Moon's diameter is 2180 miles, and her distance from the Earth 240,000 miles: she completes her orbit in 27 days, 7 hours, and 43 minutes; moving about 2290 miles every hour: and turns round her axis in exactly the time that she goes round the earth; which is the reason of her always presenting to our view the same face.

*Mars* is the next in order; being the first beyond the orbit of the Earth; at the distance of 144 millions of miles from the Sun. He moves in his orbit at the rate of 55,000 miles every hour, and completes his revolution in 1 year, 321 days, 17 hours, and 21 minutes; which is the length of his year. His diameter is 4200 miles; and his diurnal rotation is performed in 24 hours 39 minutes. He sometimes appears gibbous, but never horned like the moon; which shows that his orbit circumscribes that of the earth: and hence, Mars, Jupiter, Saturn, and Herschel, are called *superior planets.*

*Jupiter*, the largest of all the planets, is at the distance of 490 millions of miles from the Sun. By moving in his orbit at the rate of 29,000 miles every hour, he finishes his annual revolution in 11 years, 314 days, 12 hours. His diameter is computed to *be 89,000* miles: and by a prodigiously rapid mo-

tion on his axis, he performs his diurnal rotation in 9 hours 56 minutes. The body of this planet is surrounded by several parallel faint substances, called Belts; and he is attended by four satellites, which revolve round him and enlighten him by night, as the moon does the earth.

*Saturn* is the next in the system; at about 900 millions of miles from the Sun. Travelling at the rate of 22,000 miles every hour, he performs his annual circuit in 29 years, 167 days, 5 hours. His diameter is computed to be 79,000 miles; and his motion on his axis is so rapid, that his diurnal rotation is performed in 10 hours 16 minutes. This planet has belts, similar to those of Jupiter, and is surrounded also by a thin broad ring; as an artificial globe is by a horizon: his diameter is about 21,000 miles; which is equal to his distance from the body of Saturn on all sides. He has also seven satellites; which go round him on the outside of his ring, and nearly in the same plane with it.

Herschel is the most remote of all the planets, and was discovered to belong to this system, in 1782, by Dr. Herschel, of Bath. Its distance from the sun is about 1800 million of miles; its magnitude is about 90 times greater than that of the Earth; and his revolution round the Sun is prformed in

about 83 years. Six satellites, attendant upon him, have since been discovered.*

Q. Can you form any measure to show the proportionate bulks of these planets?

A. Supposing a globe of 24 inches diameter to be the size of the Sun, the proportionate diameter of Mercury would be about 1-eighth of an inch, of Venus, 1 fifth; of the Earth, 1-fourth, of Mars, 1-2 sixth; of Jupiter, 2 inches 1-half; of Saturn, 1 inch 9-tenths; and of Herschel, 1 inch 1-tenth.

Q. What might be the distance of the planets from the Sun, according to these proportions of their bulk?

A. Mercury would be about 32 yards from the centre of the Sun; Venus, 60 yards; the Earth, 82; Mars, 126; Jupiter 430; Saturn, 788; and Herschel, 1570, yards. In this proportion, the Moon's distance from the centre of the Earth would be only 7 inches and a half.

Q. Can you assist the imagination in forming an idea of the actual distance the planets are from the Sun?

*Besides the planets already enumerated, there are four, very recently known; but whose magnitudes, revolutions, &c. are not fully ascertained. These are: Ceres; discovered in 1801 by Piazzi, an Italian: Pallas by Olbers, a German, in 1802: Juna; by Harding, in 1804: and Vesta; discovered by Piazzi, in 1807.

A. Suppose, that a body projected from the Sun should continue to fly with the swiftness of a cannon ball, which is at the rate of 480 miles in an hour; this body would reach the orbit of Mercury, in 8 years 290 days; of Venus, in 16 years 59 days; of the Earth, in 22 years 211 days; of Mars in 34 years 62 days; of Jupiter, 116 years 166 days; of Saturn, 213 years 329 days; and of Herschel, in 427 years 290 days.

Q. What are the comets belonging to this system?

A. They are opaque, globular bodies, with transparent trains or tails; moving in very elliptical orbits, and in every direction, around the Sun. They become visible to us through only a small part of their course, as they approach the sun; and remain lost to us through their immense journeys beyond the orbit of the most distant planet; so that their number and periods cannot be easily determined.

Q. How are their tails accounted for?

A. They seem to be produced by some luminous matter in their atmosphere, which is visible only in the parts opposite to the Sun.

Q. What is an eclipse?

A. A privation of light in any of the heavenly bodies; caused by some other body coming between it and the Sun. There are various kinds of eclipses; but those of the Sun and Moon are the most remarkable.

Q. How are they caused?

A. An eclipse of the Sun (or more properly of the Earth,) is caused by the moon, as she revolves in her orbit, passing between the Sun and the Earth, and thereby intercepting his light. This eclipse begins at the west side of the sun, and can never happen except at the time of the new moon. An eclipse of the Moon is caused by the interposition of the Earth between the Sun and the Moon: this can only happen at the Full Moon; for, the Earth, being then between the Sun and the Moon, will sometimes intercept his light from the moon. This eclipse begins on the east side.

Q. Do the planets ever eclipse each other?

A. No; the bulk of the Sun, and the distances of the planets being so great, the primary planets can never eclipse one another: but a primary may eclipse its secondary, or a secondary, a primary: this is frequently the case with Jupiter and his satellites.

## OF THE FIXED STARS.

Q. What are the fixed stars?

A. They are supposed to be of the same nature with the sun; and of equal, or of greater, magnitude. They shine with their own native lustre, and *are diminished* in appearance only by their im-

ıse distance from us. These stars are said to ıxed, because they have been generally observed 'etain the same situations with respect to each ;r.

). What is their distance?

.. The nearest is computed to be above 32 mil- of millions of miles from us; which is further ı a cannon-ball would fly in 700,000 years: and ı very probable that they are situated as far ı one another as they are from us; for, there is 'isible alteration in their magnitudes, si:uations, ıistances, when viewed from the different parts he Earth's orbit; consequently, the orbit of the th, which is 162 millions of miles in diameter, ıly a point in comparison to their distance. ıce, it is easy to prove, that the Sun, seen from ;reat a distance, would appear no bigger than a ; and that the surrounding system of planets comets must be invisible from the nearest fixed .—From all this, it is highly probable, that each is a sun to a system of planets, which, at various ances, and in different periods, perform their ılutions round it; though invisible to us, by our : telescopes.

). What is the number of the stars?

.. Their real numbers can never be known. As powers of the telescope are increased, a greater ıber is discovered. The British catalogue, which 'udes a great many that cannot be seen without

the help of a telescope, contains only about 3000, and of this number, the naked eye cannot, in the clearest night, discover more than 1000.

There is a remarkable track around the heavens, called the *milky way*, from its peculiar whiteness; which is single in some parts, in others, double; and was, formerly, thought to be formed by an infinite number of very small stars: but the telescope shows it to be otherwise; and, therefore, its whiteness must be owing to some other cause.

Q. As the stars are fixed, what is the cause of their apparent motions?

A. Their apparent motions, or their risings and settings, are the effects of the Earth's rotation on its axis from west to east: and our seeing different stars, at different seasons of the year, is owing to the revolution of the Earth in its orbit around the Sun.

## GEOGRAPHY.

Q. What is Geography?

A. It is that science which describes the surface of this globe, as divided into land and water.

Q. Is the study of geography necessary?

A. This science is not only curious and entertaining, but highly useful. It opens and enlarges

mind; gives a true knowledge of the various ations of countries, with their rivers, mountains; and is of such importance in history, that without it, nothing can be understood with satisfaction correctness.

. How is the Earth proved to be globular?

. It is demonstrated to be a round body, from observations of persons standing on shore and ing a ship sailing from port: they first loose t of the bottom of the vessel; then, of the sails; lastly, of the flags on the tops of the masts. Its cular shape is also confirmed by the many voy- which have been made around it. The une- ness of the surface on land, arising from hills vales, can be no material objection to its rotun- ; since the highest mountains bear no more pro- ion to the whole surface of the Earth, than the eness on the rind of an orange does to the dness of its figure.

. What is the *Axis* of the Earth?

. An imaginary right line passing through its re, and terminating in the north and south s.

. What is the *Equator*, or equinoctial line?

. A circle encompassing the globe, in the mid- from east to west; dividing it into northern and hern hemispheres.

. When does the Sun cross this line?

*On the 20th* of March, and 22d of September,

when, the days and nights are equal, in all parts of the world.

Q. What are Meridians?

A. They are circles which run north and south, and pass through the equator and poles: they are used to measure longitudes, or the distance, from east to west, and vice-versa, of any one place from another place.

Q. What is the *Ecliptic?*

A. The sun's apparent path in the heavens.

Q. What is the Horizon?

A. It is that circle in the heavens which limits our vision, and divides the upper hemisphere from the lower. It is divided into 32 equal parts, called *points,* of which E. W. N. and S. are termed *cardinal* points.

Q. What are we to understand by the equinoctial points, or equinoxes?

A. Those two points in which the ecliptic cuts the equator.

Q. What are the solstitial points, or solstices?

A. They are the first points of the signs, cancer and capricorn; being 23½ degrees from the equator, and 90 from the equinoxes.

The Sun is in the summer solstice on the 21st of June, when the days are longest—and in the winter solstice, on the 21st of December; when the days, in the northern hemisphere, are the shortest.

Q. *Is not* the ecliptic divided?

A. Yes; into 12 equal parts, of 30 degrees each; called the 12 signs of the zodiac.

Q. What are the names, characters, and order of these signs?

A. They are as follow.

*Northern signs.*

*Aries* ♈ the Ram; *Taurus* ♉ the Bull; *Gemini* ♊ the Twins; *Cancer* ♋ the Crab-fish; *Leo* ♌ the Lion; *Virgo* ♍ the Virgin.

*Southern signs.*

*Libra* ♎ the Balance; *Scorpio* ♏ the Scorpion, *Sagitarius* ♐ the Archer; *Capricornus* ♑ the Mountain-goat; *Aquarius* ♒ the Water-bearer; *Pisces* ♓ the fishes.

Q. What are colures?

A. They are two meridians; one passing through the equinoctial, and the other through the solstitial, point, of the ecliptic.

Q. What is the *Zenith?*

A. That point in the heavens directly over our heads.

Q. What is the *Nadir?*

A. That point directly opposite the zenith; and, therefore, under our feet.

Q. What are the *Tropics?*

A. They are two circles running parallel to the equator, at the distance of 23½ degrees. That on the north is called the Tropic of Cancer; and that on the south, the Tropic of Capricorn.

Q. Describe the arctic and antarctic, or polar circles.

A. The arctic circle lies within 23½ degrees of the north pole; and the antarctic, as far, from the south pole.

Q. What are Zones?

A. They are five spaces into which the globe is supposed to be divided, by the tropics and polar circles.

Q. Describe them.

A. The *torrid zone* is 47 degrees broad, lies between the tropics, has the equator passing through the middle of it, and is very hot.

The temperate zones lie between the tropics and polar circles, are 43 degrees broad, and moderate, as to heat and cold.

The frigid zones extend from the polar circles to the poles—are 23½ degrees broad, and excessively cold.

Q. What are climates?

A. They are a sort of division of the earth, used by ancient geographers, to denote our approaching to, or receding from, the equator. The northern and southern hemispheres contain each 30 climates; *of which 24,* extending from the equator to the po-

lar circles, are termed *hour*, and the other six, *month* climates.

Q. What is latitude?

A. Latitude is the distance of any place, north or south, from the equator. It never can exceed 90 degrees.

Q. What is longitude?

A. Longitude is the distance of any place or meridian, from the first meridian. It can never, with propriety, go beyond 180 degrees.*

Q. How is the land divided?

A. Into four principal parts, or quarters; called Europe, Asia, Africa and America: which are subdivided, into empires, kingdoms, states, islands, peninsulas, isthmuses, and promontories or capes. These, together, contain about 1,000 million of people.

A continent is a great extent of land, comprehending several regions or countries, without an entire separation of its parts by water.

An island is a smaller part of land, entirely surrounded by water.

A peninsula is a tract of land encompassed by water, except at one narrow part, by which it joins the neighbouring continent.

* The first meridian may be placed any where. But it is usually fixed at the metropolis of some country, as *London, Paris*, Washington, &c.

An isthmus is a neck, or narrow part of land, which joins a peninsula to the continent.

A promontory is a hill, or point of land, stretching itself into the sea; the extremity of which is called a cape or promontory.

Q. How is the water divided?

A. Into oceans, seas, lakes, gulfs, straits, and bays or creeks.

An ocean is a vast collection of water, without any separation of its parts by land. The whole expanse of water encompassing the land forms but one general ocean: but it is generally divided into five parts; called, the Northern, Southern, Indian, Atlantic, and Pacific oceans. More than two-thirds of the whole surface of this globe is water.

A sea is a smaller collection of water, which communicates with the ocean, and is confined by land.

A lake is a large collection of water, entirely surrounded by land.

A *gulf*, or bay, is part of the ocean, running up into the land; and surrounded by it, except at a narrow passage, by which it communicates with the ocean: if a gulf be very large, it is called an *inland sea:* if very small, it is termed a *creek.*

A *strait* is a part of the ocean restrained between two shores; and is the passage which joins a gulf and sea to each other, or to the ocean.

Q. Have not these divisions of land and water some resemblance to each other?

A. Yes; a continent is similar in extent to an ocean; an island encompassed by water, resembles a lake encompassed by land; a peninsula of land, is like a gulf or inland sea; an isthmus, whereby two bodies of land are joined, resembles a strait, which unites two bodies of water; and a promontory or cape of land, is like a bay or creek of the sea.

Q. What is meant by the Old and New world?

A. Europe, Asia, and Africa, forming one large continent, are sometimes called the Old world, because they were known to the ancients; and America, which is another continent, is called the New world, because discovered by the former so lately as the year 1492.

Q. What is understood by the East and West Indies?

A. The East Indies comprehends Hindoostan, and besides the Asiatic islands, situated between the Indian and Pacific oceans; and the West Indies, the islands in the Atlantic ocean, between the two continents of North and South America.

## OF EUROPE.

EUROPE, though the least extensive of the four quarters of the globe, is, in many respects, the most important; and that which, next to our own country, demands our particular attention. It is there, that the human mind is supposed to have been the most expanded; the arts and sciences most extensively cultivated, and the greatest variety of character, government, religion, and manners, exhibited.

Europe lies between 36 and 72 deg. N. lat. and 65 E. and 10 W. long. from London; is 3,000 miles long, and 2,500 broad, containing about 150 millions of inhabitants. It is bounded E. by Asia, W. by the Atlantic, N. by the Northern ocean, S. by the Mediterranean sea, which divides it from Africa. The Christian religion prevails generally through Europe: there are, nevertheless, some Jews, and many Mahometans; and there is, perhaps, no form of government which it does not embrace.

he principal islands, and divisions of the con-
nt of Europe, are the following:

1st. *Islands in the Mediterranean.*

| *nds.* | *Chief towns.* | *Islands.* | *Chief towns.* |
|---|---|---|---|
| a, | Ivica. | Candia, | Candia. |
| orca, | Palma. | Cyprus,* | Nicosia. |
| orca, | Citadella. | Negropont, | Negropont. |
| ica, | Bastia. | Lemnos, | Lemnos. |
| linia, | Cagliari. | Scio,* | Scio. |
| y, | Palermo. | Samos,* | |
| ta, | Valetta. | Rhodes,* | Rhodes. |
| u, | Corfu. | Mytilene, | |
| halonia, | Cephalonia. | Nixia. | |
| t, | Zant. | | |

2d. *In the Irish Sea, and British Channel.*

| | | | |
|---|---|---|---|
| ey, | St. Heiler. | Anglesea, | Holyhead. |
| rnsey. | | Man. | |
| ht, | Newport. | | |

3d. *On the N. & W. of Scotland.*

| | | | |
|---|---|---|---|
| eys, | Kirkwall. | Feroes. | |
| rides, | Stornway. | Iceland, | Skalholt. |
| lands, | Lerwick. | | |

* These are Asiatic.

| DIVISIONS. | WHOLE POPULATION. | RELIGION. | GOVERNMENT. | PRINCIPAL RIVERS. |
|---|---|---|---|---|
| Ireland, } British | 6,000,000 | Prot. & Epis. } | | Shannon, Suir, Boyne, Liffey. |
| England, } Em- | 11,000,000 | Prot. & Epis. } | Mixt limited | Thames, Medway, Severn, Trent, Humber. |
| Scotland, } pire. | 3,000,000 | Presbyterian. } | mon. | Forth, Tay, Spey, Tweed, Clyde. |
| Portugal, - | 2,000,000 | R. Catholic. | Ab. mon. | Tagus and Duero. |
| Spain, - | 11,000,000 | R. Catholic. | Ab. mon. | Ebro, Guadalquiver, Guadiana, Duero. |
| France, - | 33,000,000 | R. Cath. & Prot. | Lim. mon. | Loire, Gironde, Seine, Rhone, Soanne. |
| Unit. Netherlands, | 5,000,000 | Presb. & R. Ca. | | Meuse, Scheld, Sambre, Rhine. |
| Germany, - | 24,000,000* | R. Cath. & Prot | Elect. sov's. | Danube, Rhine, Weser, Elbe, Oder, Drave |
| Austria,† - | 26,000,000 | R. Cath. & Prot. | Hered. mon. | Danube, Teisse, Save, Inn. |
| Denmark, - | 2,500,000 | Lutheran. | Ab. mon. | Eyder. |
| Sweden, - | 3,000,000 | Lutheran. | Ab. mon. | Dahl. |
| Russia, - | 33,000,000 | Greek Church. | Ab. mon. | Wolga, Don, Dnieper, Dniester, Dwina. |
| Prussia, - | 8,000,000 | Prot. & Catho. | Ab mon. | Vistula, Memel, Pregal. |
| Poland, - | 14,000,000 | R. Catholic. | | Niemen, or Memel, Prypeck, Rug. |
| Switzerland, - | 2,000,000 | R. Cath. & Prot. | Republican. | Rhine, Rhone, Aar. |
| Turkey, - | 8,000,000 | Mahometan. | Despot. sov. | Danube, Marisa, Siret, Prut. |
| Italy, - | 11,000,000 | R. Catholic. | | Po, Tiber, Arno. |

* A considerable portion of this population properly belongs to, and is included in the Austrian dominions.

† The Austrian dominions comprehend the Circle of Austria, the kingdom of Bohemia, Moravia, part of Silesia, part of Swabia, and part of Bavaria (usually exhibited on maps as component parts of Germany,) also Hungary, Galicia, Transylvania, Dalmatia, part of what once was Poland, and the Venetian territories.

| | | | TANTS. | |
|---|---|---|---|---|
| Ireland, | British | Dublin, | 200,000 | Cork, Limerick, Londonderry, Belfast, Newry. |
| England, | Em- | London, | 1,000,000 | Bristol, Liverpool, Birmingham, York, Hull, Manchester. |
| Scotland, | pire. | Edinburg, | 82,000 | Glasgow, Aberdeen, Dundee, Iverness, Greenock. |
| Portugal, | - | Lisbon, | 350,000 | Oporto, Tavira, St. Ubes, Lagos. |
| Spain, | - | Madrid, | 166,000 | Seville, Cadiz, Toledo, Barcelona, Valencia, Bilboa, Malaga. |
| France, | - | Paris, | 715,000 | Rouen, Nantz, Lyons, Marseilles, Bordeaux, Lisle, Brest, |
| Unit. Netherlands, | | Brussels, | 217,000 | Antwerp, Ghent, Namur, Maestricht, Tourney. [Toulon. |
| Germany, | - | Vienna, | 224,000 | { Hamburg, Francfort, Dresden, Prague, Ratisbon, Munich, |
| Austria, | - | | | { Venice, Prague, Gratz, Presburgh, Buda, Trieste. [Leipsic. |
| Denmark, | - | Copenhagen, | 100,000 | Elsinore, Sleswick, Wiborg, also Bergen, and Christiana in |
| Sweden, | - | Stockholm, | 80,000 | Gothenberg, Upsal, Christianstadt, Calmar. [Norway. |
| Russia, | - | Petersburg, | 170,000 | Moscow, Archangel, Kiow, Riga, Oczacow, Novogorod. |
| Prussia, | - | Berlin, | 156,000 | Koningsburgh, Breslaw, Warsaw,* Danzic, Magdeburg. |
| Poland, | - | Warsaw, | 64,000 | Cracow, Wilna, Grodno. |
| Hungary, | - | Presburgh, | 27,000 | Buda, Hermanstadt, Lemburg, Esseck, (*all included in* Aust.) |
| Switzerland, | | Berne, | 13,000 | Basil, Geneva, Lausaune, Friburg. |
| Turkey, | - | Constantinople | 500,000 | Adrianople, Sofia, Salistria, Belgrade, Larissa, Salonica, |
| | | Rome, | 130,000 | [Athens, Corinth. |
| | | Naples, | 400,000 | |
| Italy, | - | Milan, | 128,000 | |
| | | Genoa, | 80,000 | |
| | | Florence, | 70,000 | |

* The Capital of Poland, which no longer exists as an independent state.

The Europeans in general are well made, tolerably fair, except in Spain; where they in to be swarthy: the Spaniards and Hungarians whiskers, and the Turks long beards.

Q. What are the commodities of these count

A. In the north parts, are, pitch, tar, rosin, h deals, masts, furs; iron, coal, and tin. In the dle, corn, cider, hops, salt; lace, lawn, camb woollen, and linen cloths; leather, clocks, wat hardware, toys, paper, hats, gloves, and glass. the south, wine, rice, raisins, oranges, lemons, ton; marble, alum, amber, velvet, and mohair.

Q. What are the chief mountains?

A. The Dofrine hills, between Sweden and way; the Hyperboræan mountains, in Russia; Cheviot hills, between England and Scotland; Pyrenees, between Spain and France; the Alp Switzerland, the south of France, and nort Italy; and the Appennines, which run thr Italy from north to south. Besides these, there Etna or Gibel, in Sicily; Vesuvius, near Na and Hecla, in Iceland; which are volcanic or b ing mountains.

Q. What are the most noted rivers?

A. The Danube, which runs through Germ Hungary, and Turkey; the Rhine, Elbe, and O in Germany; Loire, Rhone, and Seine, in Fra Duero, and Tagus, in Portugal; Guadiana, Gua quiver, and Ebro, in Spain; Tiber, and Po, in

Volga, and Don, in Russia; Thames, and Severn, in England; Forth, and Tweed, in Scotland; and Shannon, and Liffey, in Ireland.

## ASIA.

Q. How long and broad is Asia, and how is it bounded?

A. It is about 4700 miles long, and 4300 broad; and contains, at least, 500 millions of people. It is bounded, on the east, by the Pacific ocean—west, by the Red, Black, and Mediterranean seas, with a part of Europe—north, by the Frozen ocean, and south, by the Indian ocean.

Q. What is it that makes the geography of Asia particularly interesting?

A. We feel a particular interest in the geography of Asia, because it was there, according to the sacred annals, that the Garden of Eden was planted, and our first parents, created; there, stood the famous tower of Babel, the magnificent temple of Solomon, and the renowned cities of Sodom, Gomorrah, Nineveh, Babylon, Troy, &c. In this country, our Saviour was born, and completed the great work of our redemption; in short, this was the theatre of almost every action recorded in the holy scriptures.

The principal regions and kingdoms are as follow:

| | *Countries.* | *Chief towns.* |
|---|---|---|
| Tartary. | Russian | Tobolsk |
| | Chinese | Chynian |
| | Mogul | |
| | Independent | Samareand |
| | China | Pekin |
| | Tonquin | Cachao |
| | Laos | Lanjan |
| | Cochinchina | Thonaoa |
| | Cambodia | Cambodia |
| | Siam | Siam |
| | Malacca | Malacca |
| | Pegu | Pegua, Unimera |
| | Barmah | Ava |
| | Thibet | Lassa |
| | Assam | Chergong |
| India. | Hindoostan Pro. | Delhi, Calcutta |
| | Deccan | Hydrabad |
| | Mysore | Seringapatam |
| | Carnatic | Madras |
| | Persia | Schiras, Ispahar |
| | Arabia | Mecca |
| *Turkey.* | Syria | Aleppo |
| | Palestine | Jerusalem |
| | Natolia | Smyrna |
| | Diarbec | Diarbekar |
| | Irac Arabia | Bagdad |
| | Armenia | Erzerum |
| | Curdistan | Scherazor |
| | Georgia | Tefflis |
| | Circassia | |

The Turks, Persians, Moguls, and Chinese, are of good shape and complexion. The people of India are tawny; but their features are pleasing. The Tartars, Chinese, and people of India, pull their beards up by the root.

Q. In what, does the trade of these nations consist?

A. In the regions of Tartary, are sables, martins, furs, iron, rhubarb, musk, &c.: in other parts, silk, cotton, carpets, tapestry, and mohair; cinnamon, nutmegs, aloes, myrrh, camphire, and manna; coffee, tea, gold dust, quicksilver, diamonds, porcelain, and lacker; japan wares, &c.

Q. What are the islands of Asia?

A. They are very numerous. The principal one in size is New Holland, surrounded by the Indian and the Pacific ocean; the others, of the most note, are Borneo, Celebes, Sumatra, Java, and Ceylon, in the Indian ocean; Niphon, New Guinea, Formosa, Luconia, Mindanoa, in the Pacific ocean; and Cyprus, in the Levant or eastern part of the Mediterranean sea.

Q. Are there any remarkable mountains in this quarter?

A. The chief, are, Ararat, near the Caspian sea, on which, the ark rested, after the flood; Horeb, and Sinai, in Arabia; Libanus, in Palestine; Imaus, in Tartary; Caucasus, between the Black and Cas-

pian seas; and Taurus, running from east to west, through all Asia.

Q. What are its rivers?

A. The principal are, the Tigris and Euphrates, between Arabia and Persia; Tobal and Oby, in Tartary; Ganges and Indus, in India; and the Hoambo and Tay, in China.

On the north of China, runs a vast brick wall, supposed to be 1500 miles in length, from 20 to 25 or 30 feet high, and broad enough for six horsemen to travel abreast with ease: it was built before the commencement of the Christian era, and, even at this time, is little decayed.

## OF AFRICA.

Q. How is Africa bounded?

A. On the north, by the Mediterranean, which separates it from Europe; on the east, by the isthmus of Suez, the Red sea, and the Indian ocean, which divide it from Asia; and on the west, by the Atlantic ocean, which separates it from America. The southern extremity of Africa is called the Cape of Good Hope. Africa is entirely surrounded by water, except at the isthmus of Suez, about 120 miles over, between the Mediterranean and the Red sea. Its utmost length, from north to south, is about 4300 miles, and the greatest breadth, *3500.*

Q. What are the countries of Africa?

A. This quarter, except along the coast, is imperfectly known; but, according to the best accounts and conjectures, it may be divided as follows:—

| | *Countries.* | *Chief towns.* |
|---|---|---|
| rbary | Morocco | Fez |
| | Algiers | Algiers |
| | Tunis | Tunis |
| | Tripoli | Tripoli |
| | Barca | Derna |
| | Egypt | Cairo |
| | Bilidulgerid | Dara |
| | Zahara | Tegessa |
| | Nigritia | Madinga |
| | Bornou | Bornou |
| | Cashna | Cashna |
| | Fezzan | Mourzook |
| | Nubia | Sennar |
| | Abyssinia | Gondar |
| | Abex | Suaquam |
| | Adel | Zeila |
| | Guinea, Upper | Benin |
| wer | Loango | Loango |
| inea | Congo | St. Salvador |
| | Angola | Loanda |
| | Benguela | Benguela |
| | Mataman | |

| *Countries.* | *Chief towns.* |
|---|---|
| Monomugi | Chicova |
| Zanguebar | Melinda |
| Monomotapa | Monomotapa |
| Sofala | Sofala |
| Caffraria | |
| Hottentot | Cape Town. |

In Egypt, Bilidulgerid, Zahara, and Abyssinia, the people are of a tawny complexion; but in all other parts they are quite black, have flat noses, thick lips, and hair like wool.

Q. What are the commodities of Africa?

A. In Barbary, Egypt, and Nubia, are rice, figs, raisins, oranges, and lemons; citrons and almonds; pomegranates, olives, and senna; leather, civet, sugar, and indigo: in Nigritia and Guinea, ostrich's feathers, gold dust, elephant's teeth, and pepper: in the south, along the coast, ambergris, frankincense, musk, millet, pearls, gold, silver, &c. But the persons of the natives make the most considerable article in the traffic on the Guinea or western coast; where, the Europeans and Americans, to the disgrace of humanity, and contrary to their own laws, purchase them, like so many cattle, carry them to the West Indies or to the American continent, and there sell them for slaves.

Q. What are the islands of this quarter?

A. The only considerable one in size is Madagascar, in the Indian ocean; the others are all small. The most remarkable are St. Helena, Ascension, St. Jago, St. Vincent, Mayo, Canary, Teneriffe, Ferro, Madeira, in the Atlantic ocean.

Q. Are there any mountains of note?

A. The principal are, Sierra Leone, or Lion Mountains, between Nigritia and Guinea; Atlas, between Barbary and Bilidulgerid; the mountains of the Moon, between Abyssinia and Monomotapa; and the Peek of Teneriffe, which rises nearly three miles above the level of the sea.

Q. What are its rivers?

A. They are neither numerous nor large, the Nile excepted: the most noted, are the Nile, in Nubia and Egypt; and the Niger, running through all Nigritia; of which, the Gambia and Senegal are branches.

Q. Give me some account of the pyramids of Egypt.

A. The pyramids of Egypt, near Cairo, are the most stupendous structures that ever were raised by the hands of men: the basis of the largest covers eleven acres of ground, and its perpendicular height is 500 feet; but if measured obliquely, 700 feet. Their antiquity is beyond the researches of history, and their original use, still unknown.

## OF AMERICA.

Q. Give me some account of America.

A. The continent of America is composed of two great peninsulas, joined by a neck of land about 60 miles over, called the isthmus of Darien or Panama. These, taken together, extend from N. to S. about 8,000 miles, and are of very unequal breadth.

Q. When, and by whom, was America first discovered?

A. In the year 1492, by Christopher Columbus, a native of Genoa: he left Palos, in Spain, on the 3d of August, with three small ships, fitted out for him by Isabella, queen of Castile; and, after a perilous voyage of 33 days, landed on one of the Bahama islands: where, the astonished natives, simple, naked, timorous, and inoffensive, received and treated him and his companions as beings of a superior order, and of celestial origin. Columbus afterwards visited several other islands of the same group; and, in directing his course southerly, fell in with Cuba and Hispaniola; which he found, not only inhabited by a humane, hospitable people, but abounding in all the necessaries and comforts of life.

Q. Did Columbus ever return again to Spain?

A. Yes; and was received with unbounded applause, and treated with the greatest respect. He visited America again several times, and extended his discoveries greatly to the emolument of the Spanish crown; but the ungrateful Ferdinand, after the death of his queen, Isabella, who had been the friend and patroness of Columbus, suffered him to waste the evening of his days, injured and oppressed. He died at Valadolid, the capital of Castile, in the 59th year of his age, A. D. 1506.

Q. Whence, does America take its name?

A. From Amerigo Vespucci, a Florentine; who, among a multitude of other adventurers, was drawn from the shores of Europe to the new world, in quest of riches. He sailed to the southern continent, wrote a history of his voyage, and had the address, thereby, to give his name to half the globe.

Q. When, and by whom, was North America first discovered?

A. In the year 1497, by Sebastian Cabot, a native of Bristol, England; when sailing on a voyage of discovery, in the employment of Henry VII.

Q. Did not the Spaniards early plant colonies in some of the West Indian islands?

A. Yes; in several, soon after their discovery; and, thence, by cunning, conquest, and cruelty, they, after a few years, established themselves in

many extensive and fertile regions, both of North and South America.

Q. Who were the principal agents in these conquests and establishments?

A. Ferdinando Cortes and Francisco Pizarro (two monsters of cruelty) by whose instrumentality, vast multitudes of innocent natives perished in the flames, by the sword, and other means.

Cortes subdued the Mexicans between the years 1518 and 1522; and Pizarro, about the year 1535 conquered Peru, and founded the city of Lima.

Q. Whence, is it supposed, that America was first peopled?

A. From the north-east part of Asia; but at what time is very uncertain: it must, however, have been many hundred years before Columbus's discovery; as, Mexico, Peru, and the West Indies were all, at that time, very populous.

## OF NORTH AMERICA.

Q. Give me the length, breadth, and boundaries of North America.

A. It is nearly 5,000 miles long, and from 1 to thousand broad; bounded E. by the Atlantic, W by the Pacific, N. by the Northern ocean, and S by the Gulf of Mexico and S. America.

Q. *What* are its grand divisions?

A. They are—1st. The British colonies, on the —2d. The United States, in the middle; and . The Spanish provinces, on the S. and W.; beles extensive regions of unexplored country, ly- to the N. and N. W. of the United States, and abited by numerous tribes of Indians, of whom know but little.

## BRITISH COLONIES.

| *Colonies.* | | *Chief towns.* |
|---|---|---|
| wfoundland | Islands | Placentia. |
| pe Breton | | Sydney. |
| John's | | Charlotte Town. |
| va Scotia | | Halifax. |
| w Brunswick | | St. John's. |
| wer Canada | | Quebec.* |
| per Canada | | York. |

New Britain, a sterile, cold country, including dson's Bay and Esquimaux, with New North d South Wales.

Quebec is situated on the St. Lawrence river, contains ut ten thousand inhabitants, is the capital of all British erica, and residence of the Governor General.

These countries are valuable, chiefly for their fisheries, , trade, and lumber.

## UNITED STATES.

Q. What do you know of the history of th of America now called the United States?

A. That it was originally an extensive v nes, inhabited by numerous tribes of warli dians; and though it was known to the Engl early as 1498, they were not able to effect an manent settlement in any part of it till abc year 1607; when, they succeeded in establis colony at James-town, in Virginia. Other ments were afterwards made, by emigrant Europe, in different parts of this territory.

Q. Did not these infant colonies suffer co ably by Indians?

A. Yes; many of the first settlers were e cut off by the Indians, or perished by hunger

Q. Can you proceed with this narrative?

A. Yes; and I observe, that in process o Great Britain, either by treaty or conquest, l mistress of the whole continent; from the regions of the north, to the Gulf of Mexico south: and the colonies, chiefly composed c grants from her, grew in strength, wealth, s sources, with amazing rapidity.

Q. Did these colonies appear to feel an *sure of* attachment to her?

A. Yes, very great: they cheerfully fought her battles, submitted to her government, and received her laws; which, for a long time, were wise and equitable.

Q. Did any thing occur to interrupt this harmony and good understanding?

A. Yes: In the year 1765, the British Parliament changed their measures towards the American colonies; and, attempting to raise a revenue from them, by oppressive taxes, and spurning their remonstrances and petitions for redress, lost their affections and their confidence, and roused them to resistance and opposition.

Q. What measures were afterwards adopted by the Americans?

A. They united for their mutual defence, and chose deputies to represent them in congress, to conduct their public affairs. These deputies first met at Philadelphia, in September, 1774. The breach continued to widen, a war ensued, and on the 19th of April, 1775, the first battle, between the American and British armies, was fought at Lexington, near Boston; and on the 4th of July, in the following year, the Congress, then sitting at Philadelphia, declared the thirteen United colonies to be *free* and *independent* states.

Q. Who was commander in chief of the American armies during this war?

A. George Washington; a native of Virginia.

Q. How long did this war last?

A. About eight years; during which time, g volour and magnanimity were displayed, and credible sufferings endured, by the Americans.

Q. Who ultimately triumphed, and when peace established?

A. The Americans at length gained their p and peace was concluded in 1782: when, G Britain, after expending nearly 120 millions money, and losing 50 thousand men, relinquis all claim to the dominion of these states, and yi ed to their arms what she had long haughtily re ed to their prayers.

Q. Did America receive any foreign aid in struggle for liberty?

A. Yes; early in the contest, France ackn edged her independence, and lent her aid, bot money and men; and, afterwards, Holland g pecuniary assistance, and, as well as Spain, arrayed in arms against Great Britain.

Q. Does the same confederation into which states entered at the commencement of the still continue?

A. No: It was soon found to be inadequat the purposes for which it was framed: deleg were appointed from the several states to for new constitution; which was drawn at Philadel in 1787; and in 1789 it was organized, and *continues* the supreme law of the land.

Q. What form of government was adopted in the United States?

A. Republican: It is vested in a president and two legislative branches, viz. a Senate and House of Representatives. The individual state governments are also republican.

Q. How is the President appointed?

A. The President and Vice-President are chosen by electors, who are appointed by the people for that purpose. They continue in office four years, and may be re-elected as often as the people think proper.

Q. By whom, are Senators chosen?

A. By the state Legislatures: two by each state; with a biennial rotation of one third. Their term of office is six years.

Q. By whom, are the House of Representatives chosen?

A. By the people at large; one for every thirty-five thousand, and to serve two years.

Q. Who was the first President of the United States?

A. George Washington: He was twice unanimously elected to that office. Upon his declining a third election, he was succeeded by John Adams. After serving one term, he gave place to Thomas Jefferson; who, having served two terms, and declined a third election, was followed by James Ma-

dison, for eight years; and by James Monr
the year 1817.

Q. How are the United States bounded?

A. The United States and their territorie
bounded E., by the Atlantic ocean and New B
wick, W., by the territory of Spain, N., by
Canada and the lakes, and south, by the g
Mexico and the Spanish possessions.

Q. How long, and broad, are the United S

A. They are 1400 miles long, from N. E.
W., and, (exclusive of Louisiana) from 7
1200 broad, containing more than a milli
square miles, and upwards of nine millions
habitants.

Q. What is the military strength of the U
States?

A. The military strength of this country l
a well disciplined militia, of about 600,000
men, with about ten thousand standing troop
ployed on the frontiers, and in the different
tresses of the union. Its navy, established
for the protection of commerce, is yet in its i
cy, and consists of

| | | | |
|---|---|---|---|
| 4 | vessels (of the line) | of 74 | guns each. |
| 6 | do. | of 44 | do. |
| 3 | do. | of 36 | do. |
| 4 | | of 32 | do. |
| 3 | | of 16 | do. |
| 1 | | of 12 | do. |

There are several ships of the line now building.

Q. What have you to observe respecting the soil and climate of this country?

A. The climates vary from *warm* to *very cold:* the soil has all the grades, from *worst* to *best;* and produces, or, by cultivation, may be brought to produce, almost every species of grain, fruit, pulse, roots, and plants, found in the different parts of the world.

Q. What are the principal mountains?

A. The principal mountains in the United States are, the White mountains in New Hampshire; and the Alleghany, which include a great number of ridges, under various names. They extend from Hudson's river, in the state of New York, in a south-western direction, upwards of 900 miles; in various breadths, from 60 to 150 miles.

Q. Describe the face of the country in the United States.

A. Between these mountains and the ocean, the face of the country is generally level; especially to the southward: but, west of the Alleghanies, it is finely diversified, well watered, and fertile. The eastern, or New England, states, are elevated, rocky, and uneven.

On, and within, the northern boundary of the United States, is a chain of fresh water lakes; the largest, perhaps, in the world. Lake Erie is 300 miles long, and 40 broad—Ontario and Michigan,

each, in circumference, 600 miles—Huron 1000 miles, and Superior 1500. Between Lake Erie and Ontario, are the great falls of Niagara. The river is here 742 yards wide, and falls 137, or, as some say, 150 feet, perpendicularly, over a rock; affording a scene, at once the most awful, romantic, and interesting, that can be imagined. The noise of this astonishing cataract, is heard to the distance of 20, 30, or even 40, miles; and a constant mist arises from it; in which, when the sun shines, may be seen all the colours of the rainbow. In the winter, it congeals on the neighbouring trees, and exhibits most beautiful appearances.

There is, on the Mississippi, a pleasing cataract, called St. Anthony's Falls; where, the whole river, 250 yards wide, descends, perpendicularly, more than 50 feet. Another remarkable cascade, named the Falling Spring, is seen on a branch of James' river, in Virginia; where, the descent is at least 200 feet, perpendicular.

Q. Have the United States any considerable ommerce?

A. Yes: their merchants trade extensively with most every part of the commercial world.

Q. What are the principal articles of their trade?

A. The principal exports are, cotton, tobacco, ır, corn, rice, flaxseed, pitch, tar, lumber, pot-es, salted fish, and oil. The imports consist,

chiefly, of cloths, and hardwares; tea, coffee, sugar, spirits, and wines.

Q. What is the capital of the United States?

A. Washington, a flourishing town in the district of Columbia, on the Potomack, is the seat of government. It lies in 37 deg. 53 min. N. lat. and is 139 miles S. W. from Philadelphia, and 40 from Baltimore.

Q. Of how many states, does the union consist?

A. Of twenty-three; besides extensive territories, not yet sufficiently populous to authorise their admission into the union as additional sister states. Their names, population, capitals, chief towns, rivers, &c. are as follow:

| STATES. | WHOLE POPULATION IN 1810. | CAPITAL, or SEAT OF GOVERNMENT. | CHIEF TOWN. | INHABITANTS. |
|---|---|---|---|---|
| New Hampshire, | 214,460 | Concord, | Portsmouth, | 5,400 |
| Vermont, | 217,895 | Montpelier, | Bennington, | 2,500 |
| Massachusetts, | 472,040 | Boston, | Boston, | 50,000 |
| Rhode Island, | 76,931 | Providence, | Providence, | 7,000 |
| Connecticut, | 261,942 | Hartford and New Haven, | Hart. & N. Haven, each, | 5,400 |
| New York, | 959,049 | Albany, | New York, | 120,000 |
| New Jersey, | 245,562 | Trenton, | Trenton, | 2,000 |
| Pennsylvania, | 810,091 | Harrisburg, | Philadelphia, | 120,000 |
| Delaware, | 72,674 | Dover, | Wilmington, | 3,500 |
| Maryland, | 380,546 | Annapolis, | Baltimore, | 46,555 |
| Virginia, | 974,622 | Richmond, | Norfolk, | 7,000 |
| North Carolina, | 555,500 | Raleigh, | Newbern, | 2,500 |
| South Carolina, | 415,115 | Columbia, | Charleston, | 24,711 |
| Georgia, | 252,433 | Millidgeville, | Savannah, | 7,640 |
| Tennessee, | 261,727 | Knoxville, | Knoxville, | 1,000 |
| Kentucky, | 406,511 | Frankfort, | Lexington, | 7,000 |
| Ohio, | 230,760 | Columbus, | Cincinnatti, | 7,000 |
| Louisiana, | 76,556 | New Orleans, | New Orleans, | 24,552 |
| Indiana, | | Vincennes, | Vincennes, | 883 |
| Mississippi, | | | | |

| STATE | OTHER CONSIDERABLE TOWNS. | PRINCIPAL RIVERS. |
|---|---|---|
| N. H. | Exeter, Concord, Dover, Amherst, Hanover. | Piscataqua, Merrimack. |
| Verm. | Burlington, Middlebury. | Lamoiell, Onion, Otter. |
| Mass. | Salem, Newburyport, Berwick, Taunton, Ply- | Connecticut, Merrimack. |
| R. Isl. | Newport, Bristol, Warren. [mouth. | Providence, Taunton. |
| Conn. | New London, Norwich, Middleton, Wethersfield. | Connecticut, Housatonick. |
| N. Y. | Troy, Poughkeepsie, Lansingburg, Schenectady. | Hudson, East River, Mohawk, Genessee. |
| N. J. | Brunswick, Burlington, Princeton, Newark. | Raritan, Passaick, Hackensack. |
| Penn. | York, Reading, Pittsburg, Lancaster, Carlisle, Bethlehem, Columbia. | Delaware, Susquehanna, Monongahela, Alleghany. |
| Dela. | Newcastle, Wilmington, Milford. | Christiana, Brandywine. |
| Mar. | Fredericktown, Hagerstown. | Pocomoke, Nanticoke, Choptank, Chester, Patapsco, Patuxent, Potomack. |
| Virg. | Petersburg, Fredericksburg | Rappahannock, York, James, Kanhawa. |
| N. C. | Fayetteville, Edenton, Wilmington. | Roanoke, Pamlico, Nuse, Cape Fear. |
| S. C. | Georgetown, Beaufort, Camden. | Savannah, Pedee, Santee, Congaree, Edisto. |
| Geor. | Augusta, Sunbury, Brunswick, Frederica. | Ogachee, Altamaha, Oakmulgee. |
| Tenn. | Nashville, Knoxville. | Tennessee, Cumberland, Holstein. |
| Kent. | Louisville, Lexington. | Ohio, Licking, Green, Kentucky. |
| Ohio, | Marietta, Cincinnatti, Zanesville, Chillicothe. | Muskingum, Sciota, Great Miami. |
| D. of C. | Washington, Georgetown, Alexandria. | Potomack. |

Q. What are the Spanish provinces in America?

A. They are three in number;—New (including New Navarre, California, &c.) Mexico, or New Spain.

They comprehend an extensive country, between the territories of the United State east, and the Pacific ocean on the west; st from Terra Firma and the Mexican gulf south, to regions unknown, on the north.

Q. What, of the soil and climate?

A. The climate, in many parts, is insa in summer, but mild and healthy in winte soil is, in the highest degree, productive.

| *Provinces.* | *Chief towns.* | *Inhab* |
|---|---|---|
| New Mexico, | Santa Fe. | |
| Old Mexico, or New Spain, | Mexico and Acapulco, | 200,0( |

## SOUTH AMERICA.

Q. What is South America?

A. South America is a vast peninsula, of a tri-gular form, nearly encompassed by the great ith sea. It is about 4000 miles long, by nearly 0 broad, and connected to North America by isthmus of Darien.

Q. What, of the mountains of South America?

A. The Andes, extending from north to south, whole length of this continent, are the loftiest most extensive range of mountains upon the le face of the globe, and embosom several anoes of the most sublime and terrific descrip-

*himborazo*, the most elevated point of the An-, rises 20,280 feet above the level of the sea, ch is 5000 feet higher than the summit of the brated Mount Blanc of Savoy.

Q. What are the principal rivers of South Ame-?

A. The Amazon, La Plata, Orinoko, Para, and Francis; with many others of less size and e. Amazon, 3000 miles long, of great width depth, is the largest river in the world; and La Plata, upwards of 2000 miles long, and, r the mouth, 150 broad, is little inferior to it.

Q. What, of the soil and climate of South A rica?

A. So extensive a region must have a gre riety, both of soil and climate; but, it may b served, in general, that the bountiful Creato here liberally bestowed whatever is necessar the comfort and convenience of man.

South America has long been celebrated f rich mines of gold and silver. The whole po tion may be estimated at about 14 millions: of the natives (the Patagonians) are of od stature.

Q. What are the principal divisions of America?

A. Terra Firma, Peru, Chili, and Paraguay longing to Spain; Brazil, to the Portuguese; ana, to the French and Dutch; and Amazoni Patagonia, to the natives.

| | | |
|---|---|---|
| Terra Firma, | Carthagena, | 25,000 |
| | Panama, | |
| Peru, | Lima, | 54,000 |
| | Quito, | 50,000 |
| Chili, | St. Jago, | 40,000 |
| | Baldavia, | |
| Paraguay, | Buenos Ayres, | 35,000 |
| Brazil, | Rio Janeiro, | 200,000 |
| | St. Salvador. | |

| | | | |
|---|---|---|---|
| Cayenne, | Cayenne, | 2,000 | F. |
| Surinam, | Paramaribo, | 2,500 | D.* |
| nia, | (no town) | | Nat. |
| ia, | (no town) | | Nat. |

## THE WEST INDIES.

What is to be understood by the West In-

nder the general term, West Indies, are in-
a multitude of Islands, lying in several
between the two great continents of North
th America.

belong to different European powers: ma-
of considerable size, and great commercial
nce.

What, of the climate and seasons?

s these Islands all lie within the torrid
ney are oppressed with great heat, and have
frost, snow, nor cold weather; the rains
the only distinction of seasons. Violent
rms, however, sometimes happen, and earth-
are not uncommon.

What are the principal articles of produce
portation?

ugar, and coffee; cotton, rum, and molasses;
pepper, allspice, cocoa, and fruits.

ch Guiana, or Surinam, is at present held by the

All the labour of cultivation is performed by negroes; who compose more than seven-eighths of the whole population, amounting to nearly one million and a half.

The principal islands, with their chief towns, are as follow, viz.

| | | | |
|---|---|---|---|
| Cuba, | Havanna, | 12,000 | S. |
| St. Domingo, | Cape Françaís, | 8,000 | |
| | St. Domingo, | 25,000 | |
| Jamaica, | Spanish Town, | 5,000 | E. |
| | Kingston, | 67,000 | |
| Porto Rico, | Porto Rico, | - | S. |
| St. Thomas, | - - | - | Da. |
| St. John, | - - | - | Da. |
| Tortola, | - - | - | E. |
| St. Croix, | - - | - | Da. |
| St. Eustatia, | Eustatia, | - | Du. |
| St. Christopher's, | Bassetterre, | - | E. |
| Antigua, | St. John's, | - | E. |
| Guadalope, | Bassetterre, | - | F. |
| Dominica, | Charlotte Town, | | E. |
| Martinique, | Fort Royal, St. Pierre, | | F. |
| St. Lucia, | - - | - | F. |
| Barbadoes, | Bridge Town, | | E. |
| St. Vincent, | Kingston, | - | E. |
| Grenada, | Fort Royal, | - | E. |
| Tobago, | - - | - | E. |
| Curacoa, | - - | - | Du. |

## CHRONOLOGY.

Q. What is Chronology?

A. It is the science of computing time, distinguishing its parts, and ascertaining the true period of events.

Q. What is time?

A. Time is the measure of duration; and is either absolute or relative. *Absolute* time, or *simple duration*, flows uniformly, from eternity to eternity; and has no regard to external objects. *Relative*, or *apparent time*, is that portion of duration, which is measured by the uniform motion of some sensible object; as the sun, the moon, clocks, watches, &c.

Thus, two persons, one in London and the other in Philadelphia, observing an eclipse of the sun, may see it commence or terminate at the same moment of *absolute time;* while, in *relative time*, their clocks or watches will show a difference of five hours.

Q. What are the divisions of time?

A. Centuries, ages, years, months, weeks, days, hours, minutes, and seconds.

Q. What is the difference between an age and a century?

A. An *age* is, properly, the space of time during which a man or a generation of men, lives upon the

earth; a century is 100 years: but *age* is taken in a more extensive sense, and eml several generations, or even centuries; as, Adam, to the deluge, is termed the first age world, &c.

Q. What is a year?

A. A true solar year is twelve months, space of time in which the earth moves roun sun; or in which the sun completes his apr revolution in the ecliptic. It consists of 365 5 hours, 48 minutes, and 57 seconds.

Q. Of how many days does a common civil consist?

A. Of 365: but, as the odd hours, minutes, seconds, of the solar year, amount, in four y to nearly one whole day, every fourth year 366 days, and is called *leap year.*

Q. What is to be understood by *old* and *style?*

A. The civil year, as settled by Julius Cæ contained 365 days and 6 hours; which wa minutes 3 seconds more than the true solar This excess caused the times of the equinoxes other seasons of the year, to arrive 1 day ea than they ought, in every 130 years. Thus, a time of the Nicene Council, A. D. 325, the ve equinox fell on the 21st of March; but, in A 1582, it occurred 10 days earlier; hence, it *seen, that* great confusion must attend the cel

tion of Easter and other moveable feasts, which would at length fall on the same days. This led Pope Gregory XIII, to think of reforming the style. He, accordingly, ordered the 10 days that had been gained, to be struck out of the year; which brought the vernal equinox again to the 21st of March. And to prevent a repetition of this inconvenience, Gregory further ordered that only every fourth year should have 366 days, and the others, 365.

This is called the Gregorian, or *new*, style; and agrees so nearly with the true solar time, that 6000 years will not make the difference of one day.

Q. When was the new style adopted in Great Britain and America?

A. Not till A. D. 1752; when 11 days, which had been gained, were taken from that year, by act of parliament.

Q. What is a month?

A. The month is *periodical*, *synodical*, or *civil*. A periodical month is the time in which the moon passes round the earth; namely, 27 days, 7 hours, and 43 minutes.

The *synodical* month, called a lunation, is the time which elapses from the moon's parting with the sun, at a conjunction, till her return to him again; which is 29 days, 12 hours, 44 minutes.

*Civil months* are the 12 kalendar months, into which the year is divided for the use and convenience of civil life.

They are of different lengths, and named as follow:—

1. *January;* from *Janus*, the most ancient king of Italy, who was deified by the people, and to whom they kept this month as sacred.

2. *February;* from *Februo*, to purify or cleanse by sacrifice. This was the last month of the year, in which purifications and sacrifices were used among the ancient Romans, for the ghosts of the dead.

3. *March;* from *Mars*, the god of war; to whom this month was kept sacred.

4. *April;* from *aperio*, to open or unfold; because, in this month, nature begins to unfold all her beauties.

5. *May;* from the heathen Goddess, *Maia;* to whom, this month was held sacred.

6. *June;* from the heathen Goddess, *Juno.*

7. *July;* in honour of *Julius* Cæsar.

8. *August;* in honour of *Augustus* Cæsar.

9. *September;* from the Latin *septem*, seven.*

10. *October;* from the Latin *octo*, eight.

11. *November;* from *novem*, nine.

12. *December;* from *decem*, ten.

* At this period of time, the year began with March.

Thirty days hath September,
April, June, and November;
February, twenty-eight alone,
All the rest have thirty one,
But when you come to leap-year time,
Give to February full twenty-nine.

Q. What is a week?

A. The succession of seven natural days; called Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

On Sunday, the ancient Saxons worshiped the Sun; on Monday, the Moon; on Tuesday, their idol, Tuisco; on Wednesday, Woden; on Thursday, Thor; on Friday, the goddess, Freia; and on Saturday, the idol, Seater.

On account of the derivation of these names of the months and days from heathen superstition and idolatry, the use of them is rejected, by some religious denominations; who adopt in their stead, 1st month, 2d month, 3d month; and 1st day, 2d day, 3d day, &c. Others reject *Sunday*, only; and use *Sabbath*, or *Lord's day*, in its place.

Q. What is a day?

A. A day is either natural or artificial. The natural day contains 24 hours; the artificial day is the time between the rising and setting of the sun.

Q. Do the different nations of the earth all begin the natural or civil day at the same time?

A. No; the Americans, British, French, Dutch, Germans, Spaniards, Portuguese, and Egyptians, begin it at midnight; the ancient Greeks and Jews, commenced at sun-set; as do now the modern Italians and Chinese; while the Persians, Syrians, and modern Greeks, count from sunrise; and astronomers, from noon.

Q. Do all nations reckon the days in the same order?

A. No; Christians count from the Sabbath, or Lord's day; in memory of the resurrection of their Saviour, Jesus Christ; the Jews, from Saturday; and the Mahometans, from Friday.

Q. What is an hour?

A. The 24th part of a natural day. A minute is the 60th of an hour; and a second, the 60th of a minute.

Q. How many weeks are there in a year?

A. Fifty-two, of 7 days each.

Q. What is an epoch, and what an era?

A. An *epoch* is the time at which a new computation is begun, and from which dates are numbered by historians; as, the creation of the world, the building of Rome, the birth of Christ, &c. An *era* is, properly, an account of time from one epoch to another; but it is often used as synonimous with *epoch*.

For example, we say,

Noah's flood happened A. M. (i. e. *Anno Mundi*, or in the year of the world) 1656.

Kings, were expelled, and consular government established at Rome, A. U. C. (i. e. *ab urbe condita*, from the building of the city,) 244.

America was discovered by C. Columbus, A. D. (i. e. *Anno Domini*, in the year of our Lord) 1492.

Philadelphia was founded, A. D. 1683.

Independence was declared, July 4, 1776.

Q. What is an Olympiad?

A. A space of four years; used by the ancient Greeks, to mark the time from the institution of the Olympic games; which they celebrated at the beginning of every fifth year, in a plain near the town of Olympias. These games were contests in running, wrestling, boxing, chariot races, &c. instituted by Hercules, in honour of Jupiter, 774 years before Christ.

Q. What is a *Lustrum?*

A. A space of five years; used only by the Roman poets.

Q. What is an *indiction?*

A. A revolution of fifteen years; used by the Romans, for indicting the time of certain payments made by the people to the republic.

Q. What is *Jubilee?*

A. A public festivity.

Q. What is a *cycle* of the sun?

A. A period of twenty-eight years; in wh time, the days of the month return to the same da of the week; the sun's place, to the same signs a degrees of the ecliptic; and the commencement the leap-years, to the same days of the week.

Q. What is a cycle of the moon?

A. A revolution of nineteen years; in wh time, the new moons, full moons, conjunctions, positions, &c. return to the same days of month,

Q. Of what use, are these cycles?

A. By the revolution of the solar cycle, is fou the Dominical, or Sunday, Letter: the year of lunar cycle is called the Golden Number; a from both, is determined the time of celebrat Easter.

Q. Have not the poets made another division time?

A. Yes; they distinguish it by four ages:

1. The *golden age;* attributed to Saturn a Rhea; comprehending the earlier periods of world, when men were more virtuous and happy

2. The *silver age;* ascribed to the reign of Ju ter; extending to the time that tyrants appea among the human race, aggrandizing themsel *by oppression*, violence, and injustice.

*brazen age;* in which, rapacious men,
with the lust of dominion, endeavoured to
r brethren to a state of slavery.
*iron age;* in which, every species of
n, and which they say still continues.
t are meant by the seasons of the year?
changes and varieties which are produc-
-e, by the revolution of the earth around

t are the seasons called; and how long
ıtinue?
ıg, Summer, Autumn, and Winter; each
three months.
n does each of these seasons begin?
*ng* begins on the 21st of March; *Summer*,
of June; *Autumn*, on the 23d of Septem-
*Vinter*, on the 21st of December.
t are the dog-days?
oppressively hot days which elapse be-
19th of July and 28th of August. They
name from the great *dog star;* which is
during that time, to rise and set with the

## ARCHITECTURE.

Q. What is Architecture?

A. The art of building or erecting edifices: it is of three kinds; civil, military, and naval. Its excellence consists in giving to the materials employed, such form and disposition as to produce beauty, strength, and convenience.

Q. In what, does civil architecture consist?

A. In designing and building edifices for the uses of civil life; as, dwelling houses, churches, and colleges. These are constructed agreeably to one of the five orders of this art.

Q. What are these five orders of civil architecture?

A. They are the Doric, Ionic, Corinthian, Tuscan, and Composite. They have their names from the persons or people who invented them; except the last; which was invented by the Romans, and is a compound of the Doric, Ionic, and Corinthian.

Besides those five orders, the *Gothic*, a fanciful and sublime style of building, is still used, in the construction of many churches, both in Europe and Asia.

Q. What is military architecture?

A. The art of strengthening and fortifying towns or other places; so as to shield them from the assaults of enemies, and the violence of arms, by the

erection of forts, castles, and other fortresses, with ramparts, bastions, &c. This art is more usually termed Fortification.

Q. What is naval architecture?

A. The art of constructing ships, galleys, and other floating vessels; whether for the service of war or commerce. The construction of moles, ports, docks, &c. belongs to this art.

Q. What are the acquirements necessary for a good architect?

A. An acquaintance with drawing, geometry, optics, and history.

## PAINTING.

Q. What is Painting?

A. The art of representing objects, by lines and degrees of colours, on an even and uniform surface.

How is this art divided?

A. Into six parts: the design, the proportion, the expression, the clare-obscure, the ordonnance, and the colouring.

*Design* is the simple contour, or outlines, of the figures or things intended to be represented; or the lines that terminate or circumscribe them.

*Proportion* is the just magnitude of the several members of a figure, a group, &c.; with regard to one another, to the whole figure, the group, and the *entire piece.*

The *Expression* of a piece of painting, is the ap
pearance which it has to the eye; or, the degree
power which the artist gives it, of conveying to t
beholder, a correct idea of the object or objects
represents. It ought to be natural, lively, a
striking.

*Clare-obscure* is the art of distributing the ligh
and shades of a piece; both with regard to eas
the eye, and heightening the effect of the wh
composition.

*Ordonnance* denotes the disposition of the pa
of a picture; either with regard to the whole pie
or to the several parts.

*Colouring* is the manner of applying and co
ducting the colour of a picture; or the mixture
lights and shades, formed by the various colo
employed in painting.

Q. What are the various kinds of painting?

A. They are distinguished with regard to
materials used; the matter whereon they are
plied; and the manner of applying them. The pr
cipal kinds are as follow:

For *oil-painting*, the colours are ground in
or linseed oil; and may be applied to canv
wood, or walls; stone, glass, or metals. This
covery, which was made by a Flemish painter,
the beginning of the 14th century, is of great i
portance to the art; since, by it, the colours
*picture* are preserved much longer, and recei

softness and lustre, which the ancients, to whom it was unknown, could never give their pieces, whatever varnish they might use.

For *water colours*, or *limning*, which is a more ancient art than painting in oil, the colours are mixed with water, only; with, sometimes, the addition of a little sizing.

*Fresco* is a kind of painting done with water-colours, on fresh plaster, or on a wall laid with mortar not yet dry; so that, incorporating with the mortar, and drying along with it, the colours become extremely durable.

*Distemper* is a term for painting, when the colours are mixed with size, whites of eggs, or other proper glutinous, or unctious substances, without oil.

*Miniature* is a delicate kind of painting; consisting of little points or dots, instead of lines, and done with thin water colours.

*Encaustic* is a species of painting with burned wax. It consists in applying water colours upon a coating of bees-wax; and when the picture is dry, it is put near a fire, by which the wax melts, and absorbs all the colours.

*Enamel* is a method of painting with enamels, or metaline colours, ground and reduced to powder, and used, like other colours, with a pencil; then fused, baked again, and vitrified by force of fire.

*Glass*, is a kind of painting similar to the colours being incorporated with the gla by exposing them to a proper degree of hea

*Aquatinta* is a method of etching on copp ly invented; by which, a soft and beautiful produced, resembling a fine drawing in v lours, or Indian ink.

*Mezzotinto* is an ingenious method of re ing figures, on copper; so as to form print tation of painting in indian Ink.

## *Sculpture.*

Q. What is Sculpture?

A. The art of cutting or carving wood al into images; and of fashioning wax, earth, &c. to serve as models, or moulds for the c metaline figures.

Q. Is not this a very ancient art?

A. Of its antiquity, there can be no dou the sacred writings mention it in several pl in the case of Laben's idols, taken away by the brazen serpent, made by Moses, and th calf, by the people of Israel.

Q. What is statuary?

A. It is a branch of sculpture, employed *ing statues.* The ancients far surpassed t

erns in this art; perhaps, because it was more popular, and therefore, more cultivated.

Q. What are deemed the best specimens of sculpture in England?

A. The statues of Phrensy and Melancholy, on the piers before Bethlehem hospital, deserve to be ranked among the first performances in this art: they were executed by Cibber. There is an elegant statue of Edward VI. in bronze, at St. Thomas's hospital, in Southwark, by Sckeemaker; and another of sir Isaac Newton, at Cambridge, by Roubiliac. Westminster-abbey is a famous repository of sculpture; but the figures lose much of their effect, by being crowded together without any orderly arrangement: the monuments of the duke of Argyle and Mrs. Nightingale, both by Roubiliac, and one of Dr. Chamberlain, by Sckeemaker, seem to stand highest in the public opinion.

Q. Is it not probable, that sculpture is more ancient than painting?

A. Yes; and, from the style of ancient paintings, there is reason to conclude, that sculpture, stood first in the public esteem. also: for, the ancient painters appear to have imitated the statuaries; since their works have not that freedom of style, especially with respect to their drapery, that the pencil might easily have acquired, to a greater degree than the chisel.

Q. What is bass-relievo?

A. A term in sculpture, signifying that the figures or images do not stand entirely above the plane on which they are formed.

*Creux* is opposed to relievo; and implies that the figure, cut and formed, lies within the plane of the plate or substance engraved on.

A *bust* is the portrait of a person, in relievo, showing only the head, shoulders, and breast.

Q. Which is the more difficult of these two arts, painting or sculpture?

A. Painting has the greatest number of requisites; but, at the same time, its expedients are the most numerous; and, therefore, we may venture to affirm, that, whenever sculpture pleases equally with a painting, the sculptor is certainly the greater artist.

## MYTHOLOGY.

Q. What is Mythology?

A. The history and explication of the fabulous gods and heroes of the heathen world.

Q. Whence, is the word mythology derived?

A. From a Greek word, signifying a discourse or description of fables.

Q. Of what use, is a knowledge of these fables?

A. *It* enables us to understand the writings o

the poets, and to explain the historical and fabulous representations, often found in pictures.

Q. How are the heathen gods divided?

A. Into six classes; the celestial, terrestrial, marine, infernal, subordinate, and demi-gods.

## *Of the Celestial Deities.*

Q. Who are the celestial deities?

A. The gods of this class, are, Jupiter, Apollo, Mercury, Bacchus, and Mars; and the goddesses, Juno, Minerva, and Venus.

Q. Who was *Jupiter?*

A. The sovereign god of the heathens;* the son of Saturn and Ops, born in Crete, at the same birth with Juno. He married his sister Juno, expelled his father out of his kingdom, and divided it with his brethren. He is represented, in poetic fiction, as having metamorphosed himself into a *swan*, for Leda—into a *bull*, for Europa—into a *shower of gold*, for Danaë—and into a *shepherd*, for Mnemosynè; and, thus, to have filled heaven with his natural children.

* The Heathens, in general, believed that there was only one supreme God: but, when they considered this one great being as influencing the affairs of the world, they gave him *as many* different names; and hence proceeded their vari-

Q. How was the sovereign authority divided amongst the sons of Saturn?

A. Jupiter, as the eldest, had the heavens; Neptune, the waters; and Pluto, the infernal regions.

Q. Had Jupiter any children with Juno?

A. He had two sons, Vulcan and Mars, and a daughter named *Hebe;* who, for her extraordinary beauty, he made goddess of youth. She was likewise his cupbearer, and poured out the nectar, the drink of the gods; which they called Ambrosia.

Q. How is Jupiter represented?

A. He is generally painted as sitting with the fulmen, or thunder, or rather lightning, in one hand, and a sceptre and eagle in the other; sometimes,

ety of nominal gods. When he thundered or lightened they called him Jupiter: when he calmed the sea, Neptune; when he guided their councils, Minerva; and when he gave them strength in battle, Mars. In process of time they used different representations of this Jupiter, Neptune, &c. and considered them, vulgarly at least, as so many different persons. Afterwards they regarded each different views; accordingly as they showered down blessings, or inflicted punishments. There was also one Jupiter for Europe, and another for Africa; and in Europe there was one great Jupiter who was the particular friend of the Athenians, and another who was the special protector of the Romans. There was scarcely a town in Italy that had not a Jupiter of its own. In this way, Jupiters, *temples* and different characters almost every where

n eagle is placed at his feet; that bird having the itle of his armour-bearer: when represented in a hariot, he is drawn by four horses.

Q. Who were the parents of *Apollo?*

A. Jupiter and Latona: he was born in the island of Delos, at the same birth with Diana.

Q. What advanced Apollo among the gods?

A. The invention of physic, music, poetry and rhetoric, which are ascribed to him; and, therefore, he is said to preside over the Muses. He had a famous temple at Delphos; where, his oracles were n great estimation.

Q. In what manner, is Apollo distinguished?

A. By the beauty of his face and the gracefulness of his figure: with a laurel crown on his head, a bow and arrows in one hand, and a harp in the ther.

Q. Does not Apollo sometimes mean the sun?

A. Yes; besides those deifications, he is also he god of light; and, then, is generally called *Phœbus.*

Q. Who was *Mercury?*

A. The son of Jupiter and Maia, the god of eloquence and commerce, and the patron of thieves: he was the messenger of the gods, and conducted souls to their proper place, after their parting from he body?

Q. How is he represented?

A. As a youth of extreme lightness and agility; but the most remarkable of his distinguishing attributes are his petasus, or winged cap; his talaria, or winged shoes; and his caduceus, or wand, with wings at the top, and bound by two serpents.

Q. What do you say of *Bacchus?*

A. He was the son of Jupiter and Semelè, and was the god of wine: he is represented as a jolly beardless youth, crowned with ivy and vine leaves, a spear wrapped with the same, in one hand, and with grapes or a cup, in the other. He is usually attended by Silenus and a drunken band of satyrs, nymphs, &c. and when carried in a chariot, is drawn by lions and tigers, or by lynxes and panthers.

Q. Who was *Mars?*

A. The son of Jupiter and Juno, or, as Ovid tells the story, of Juno alone; who was displeased that Jupiter should have a daughter, (Minerva,) without female aid: being therefore a son of discontent, he was made the god of war and strife.

Q. How, is he distinguished?

A. He is painted with a fierce and sour aspect; terror every where in his looks, clothed in armour, a helmet on his head, and a spear in his hand. When in a chariot, he is drawn by two horses; which are driven by his sister, *Bellona*, the goddess of war, who is represented as a distracted woman.

Q. What are the distinguishing characters of *Juno, the sister* and wife of Jupiter?

ing queen of the gods, and the goddess of
she is beautiful, and full of majesty; has a
n her hand, a crown of roses and lillies on
and her chariot drawn by peacocks. She
led by *Iris*, her messenger, to promote
l contention; who, on account of her swift-
represented with wings, and riding on a

nence, did *Minerva* proceed?
e came forth from the brain of her father,
completely armed; and is the only one of
ing to whom pertain the prerogatives of
me rank of divinity. She is the goddess of
nd the arts, and the inventress and pre-
var.
w is she represented by the poets and

nerva or pallas, is distinguished by the
f her face, and a sternness, bordering on
e; a helmet, with a plumed crest, on her
pear in her right hand, and in the other, a
ith the head of Medusa upon it: the same
pears also on her breastplate: she is gener-
mpanied by a cock and an owl; as emblems
g and wisdom.
no was *Venus?*
e most beautiful of all the goddesses: she
om the froth of the sea, was educated by
rs, and afterwards carried by them into

heaven; where, the gods found her so extremely handsome, that they were desirous of marrying her, and named her the goddess of love; but, at last, she was married to Vulcan, the ugliest and most deformed of all the gods.

Q. In what manner, is Venus described?

A. The poets, painters, and statuaries, represent her in a variety of alluring forms; with her hair waving over her naked shoulders, or negligently tied behind, in golden tresses: with a mantle, exhibiting all the colours of the rainbow, and glittering with diamonds; sometimes flowing loosely, and at other times, bound with a girdle, called cestus: sometimes, she is exhibited like a young virgin, rising from the sea, and riding in a shell; sometimes, with a shell in her hand, and her head crowned with roses, with a mirror in her hand, and golden sandels on her feet; with a poppy in one hand, and an apple in the other. She is accompanied by Cupid and the Graces, and followed by the beautiful Adonis; who holds up her train.—When riding in her chariot, (which is of ivory, carved and gilt,) she is drawn by swans, doves, or swallows.

Q. How, is *Cupid* represented?

A. He is the god of love, appears as a naked boy, with wings, and bearing a quiver, bow, and darts; or a torch: though he is the youngest of all the gods, yet his power is deemed the strongest.

Q. Who are the *Graces?*

A. Three sisters; named Aglaia, Thalia, and Euphrosynè: they are generally represented naked, very beautiful, and with their hands connected.

## *Of the Terrestrial Deities.*

Q. Who are the terrestrial deities?

A. The most celebrated are, Saturn, Vulcan, Æolus, and Momus; Vesta, Cybelè, Ceres and the Muses: there are also others of note; which reside in the woods, and are properly called *gods of the woods.*

Q. Who is *Saturn?*

A. Saturn, the father of the gods, was the son of Uranus and Vesta, or Cœlum and Terra: his brothers were Titan, Oceanus, and many others; his sisters were Ceres and Cybelè, (otherwise Ops, or Rhea,) whom, he afterwards married. Being dethroned by his son, Jupiter, he took refuge in Italy; where, he civilized the people, and introduced several parts of agriculture.

Q. How, is he represented?

A. Under the figure of a decrepit old man, with a long beard, and hoary head; bearing in one hand a pruning hook, or scythe, and in the other a child, which he is about to devour. Sometimes, he is fur-

nished with wings and an hour-glass: Satu
Time being the same, he is thus represented,
note the swiftness of time, and that it destr
things.

Q. What do you say of *Vulcan?*

A. He was the son of Jupiter and Juno, a
husband of Venus; as mentioned before. (
count of his deformity, he was cast down fro
ven, fell on the island Lemnos, and broke h
there, he set up the trade of a smith, manufa
Jupiter's thunder, and the arms of the othe
and taught the manifold uses of fire and iro
is, therefore, represented lame and def
blackened and hardened from the forge, and
face red and fiery: sometimes, he is attend
the Cyclops, his servants and workmen; wh
only one eye, which is placed in the middle o
foreheads. This poor god is always the sub
pity or ridicule; he is the grand cuckold of h
the great celestial deities seem to have ad
him among them for amusement.

Q. What is the province of *Æolus?*

A. He is god of the winds; painted with
cheeks, like one who endeavours to blow a bla
cibly; also with wings on his shoulders, and
high-coloured, fiery countenance.

Q. Who is Momus?

A. The god of folly: his name signifies a
*mocker,* or mimic; and that is his employmen

when he finds the gods doing amiss, or neglecting their duty, he censures, mocks, and derides them, with great freedom. He is represented with a mask, and a grotesque face.

Q. Who was *Vesta?*

A. Vesta, or Terra, the wife of Cœlum, and mother of Saturn, is the oldest of the goddesses: she is represented sitting, and with a drum; because the earth is immovable, and contains the boisterous winds in its bosom: she has a crown on her head, formed of divers colours; and with several animals creeping about and fawning upon her.

There was another Vesta, the daughter of Saturn, a virgin goddess: she is the same with Ignis, or fire; and her power was exercised about altars and houses.

Q. Who is *Cybelè;* and how is she represented?

A. She is the wife of Saturn, and mother of all the gods; and, being goddess of all things which the earth sustains, she is represented as seated in a chariot drawn by lions, having garments of various colours, and figured with the images of divers creatures: she holds a key in her hand, and wears a crown of turrets on her head.

Q. What is the office of her sister, *Ceres?*

A. She is the goddess of corn and tillage; and is represented as tall and majestic, with swelling breasts and yellow hair; on her head, a turban composed of ears of corn; in one hand, poppies and corn ears, and, in the other a lighted torch.

Q. Who are the *Muses?*

A. Nine beautiful virgins, the daughters of Jupiter and the nymph Mnemosynè, or Memory: they are mistresses of the sciences, and governesses of the festivals of the gods. Their habitation was mount Parnassus.

Q. What are their names and the sciences over which they preside?

A. *Calliopè* is the goddess of rhetoric; *Clio* of history; *Erato*, of poetry; *Thalia*, of comedy; *Melpomenè*, of tragedy; *Terpsichore*, of dance; *Euterpè*, of music; *Polyhymnia*, of song; and *Urania*, of astronomy.

Q. Please to describe the *gods of the woods?*

A. The principal of these deities, and the manner in which they are represented, are as follow:

*Pan*, the god of shepherds and hunters, has a smiling ruddy face, a long beard, and two horns on his head: his skin is spotted, his thighs and legs covered with long hair, and he has the tail and feet of a goat; in one hand, he holds a crooked staff, and, in the other, a pipe of uneven reeds.

The *Satyrs* and *Fauns* are attendants on Pan; they are horned, and have the tail and legs of a goat.

*Sylvanus*, who presides over the woods, is an old man, of little stature, with the tail and feet af a goat; holding a branch of cypress in his hand.

*Silenus*, so called from his jocular temper, was the tutor of Bacchus, and his perpetual companion: he is represented as an old man, with a bald head, a flat nose, large ears, a tail, and cloven feet; he is generally drunk, and mounted on an ass; but, when walking, he is supported by a staff.

*Diana*, the goddess of the woods, was twin sister to Apollo; and, as he is sometimes called Sol, or the Sun, she is often called Luna, or the Moon.

Her delight is in hunting: accordingly, she is described as running, with a short vest girded about her; yet flying back with the wind. She is tall; her face very handsome, yet somewhat manly; and her legs are bare, well shaped and strong: her attributes are, a javelin, or a bow, quiver and arrows.

*Flora*, the goddess of flowers, is represented young and graceful; holding in her right hand the blossom of beans and peas, and adorned with various flowers.

*Pomona*, the goddess of fruit, is an amiable nymph. Her attributes are, a basket of fruit, a number of apples in her left hand, and, in her right a nosegay of flowers.

The *Nymphs* are young and beautiful virgins who attend on superior, celestial, terrestrial, and marine deities. Those of the air, are called *Aurœ;* of the woods, *Dryades;* of the mountains, *Oreades;* of the sea, *Nereïdes;* and of the rivers, or fountains, *Naiades;*.

*Of the Marine Deities.*

Q. How is *Neptune*, the god of the se scribed?

A. He is commonly represented standing, tic and serene, with a trident in his right h dolphin on his left, and treading on the ba ship. When passing over the calm surface waters, he is in his chariot, (which is a large lop-shell, drawn by sea-horses or dolphin companied by his queen and numerous ants.

Q. Whom, did he marry?

A. *Amphitrite*, the daughter of Nereus a ris, parents of the Nereïdes.

Q. Who, are his attendants?

A. Triton, the Sirens, and the Nereïdes.

Q. Who was *Triton*, and how is he repre

A. He was the son of Neptune and Am and trumpeter to his father; and is represe half man and half fish, terminating in a d tail, and bearing in one hand a wreath shell, which serves him for a trumpet, with to convene the water deities, when Neptun their assistance or counsel. Some poets h agined several Tritons; who are introduced, ly as trumpeters in Neptune's retinue, but *drawing* his chariot.

Q. Please to describe the *Sirens?*

A. They are supposed to have been the three daughters of Achelous and Melphomenè, and are called Parthenopè, Lygea, and Leucosia. The ancients describe them with the faces of women, and the bodies of birds; but the moderns represent them as beautiful virgins, from the head to the middle; and downward, as fish, covered with scales. They are said to reside on rocks; where vessels are in danger of splitting; and, alluring passengers by the sweetness of their molody, they put them to death. The Tritons and Sirens, are sometimes called *mermen* and *mermaids.*

Q. How are the *Nereïdes* represented?

A. These sea nymphs compose the train of Amphitritè, and much resemble the modern Sirens, in their figure.

Q What of the Naiades?

A. They are represented as the Sirens, half women and half fish; residing as so many domestics, in the palaces of the water gods: where they are said to work, tell stories, and wait at table.

### OF THE INFERNAL DEITIES.

Q. In what manner, is *Pluto*, god of the infernal regions, described, by the poets and painters?

A. He is represented as extremely black and ugly; with a key or a sceptre of two points in his

hand, and a crown of ebony on his head.* When riding in his chariot, he is drawn by black horses.

Q. Who was *Porserpine?*

A. The daughter of Jupiter and Ceres; stolen by Pluto out of Sicily, and carried to his subterranean dominion: where, she was the partner of his empire.

Q. How, is Pluto attended?

A. By the Fates, the Furies, and the Judges; by Harpies, Gorgons, and other monsters; also by Charon, and the dog Cerberus.

Q. Who are the *Fates?*

A. They are three sisters; represented elderly, and clothed in white, bordered with purple: their names are, Clotho, Lachesis, and Atropos. To them, is intrusted, the management of the fatal thread of life: Clotho draws the thread, Lachesis turns the wheel, and Atropos cuts the thread when spun.

Q. Please to describe the *Furies?*

A. The principal of these are three sisters; called Alecto, Tisiphonè, and Megæra: they are represented old and meagre, with pale cheeks, inflamed eyes, snakes on their heads, instead of hair, and

*This ugly immortal, finding no woman inclined voluntarily, to share his throne, had recourse to stratagem; and *violently* carried away Proserpine, daughter of Ceres, *whilst* amusing herself in gathering flowers.

whips or burning torches in their hands. Their office is to punish wicked men for their crimes, and to torment the consciences of secret offenders.

Q. Who are the *Judges?*

A. Minos, Rhadamanthus, and Æacus; sons of Jupiter. Minos holds a golden sceptre, and oversees the Judgment of the other two; each of whom holds a staff in his hand. When the souls of the dead have passed their tribunal, they are conveyed either to Elysium or Tartarus; the former, a place abounding with pleasures and delights, for the good; and the latter, a hideous dungeon, for the wicked.

Q. Who are the *Harpies?*

A. Rapacious monsters; with the faces of women, the ears of bears, and the bodies of vultures. They were three in number, all sisters; and their names were Aello, Ocypetè, and Celeno.

Q. Describe the *Gorgons?*

A. These also were three sisters; described with wings on their shoulders, serpents around their heads, and their teeth of a prodigious size. Their names were Stheno, Euryalè, and Medusa; the latter of whom was chief, and being mortal, was killed by Perseus. They could change into stone those upon whom they looked.

Q. Who was *Charon?*

A. A decrepit old man, with a long beard, yet *of youthful vigour*, but dirty in person and attire.

his employment was to ferry souls over the riv at the entrance of hell.

Q. What were those rivers?

A. Four: *Acheron*, whose waters were extre ly bitter; *Styx*, by which the gods were wont swear; *Cocytus*, flowing out of Styx, with a horr groaning noise; and the *Phlegethon*, swelling v waves of fire. Besides these rivers at the entra there was another, in Elysium, named *Lethè*, f the forgetfulness it caused; for, those who dran its waters immediately forgot all past tran tions.

Q. Is there any thing remarkable of the dog ( *berus?*

A. Yes; he had three heads, and his body covered with snakes, instead of hair: he was stati ed at the gates of Pluto's palace; and is sometii called the *porter of hell.*

Q. What other deities are there in the infei regions?

A. Old *Erebus* and his wife, *Nox*, who pres over darkness and night; *Mors*, who presides o death; and *Somnus* over sleep: the last, by his s vant, Morpheus, sends dreams to people in t world, while sleeping. *Plutus*, the god of rich is generally deemed an infernal deity; as riches co out of the earth, and are the root of all evil.

## OF THE SUBORDINATE DEITIES.

Q. Who are deemed subordinate deities?

A. Those gods and goddesses who preside over kingdoms, provinces, cities, towns, streets, houses, &c. and over infants, children, young people, and adult persons. Their number is infinite; there being almost as many gods as there are things.

## OF THE DEMI-GODS.

Q. What do you say of the demi-gods?

A. The demi-gods and heroes, were those who had human bodies, sacred minds, and celestial souls. They were the offspring of a god or goddess, with a mortal. The principal of these were, Hercules, Jason, Theseus, Castor and Pollux, Perseus, Æsculapius, Promotheus, Atlas, Orpheus, Achilles, Ulysses Orion, Osiris.

Q. Who was Hercules?

A. The son of Jupiter, by Alcmena. He was destined, by the malignity of Juno, and the fatality of his birth, to dangerous wars and difficult adventures, through the whole course of his life.

Q. What are his principal exploits?

A. They are termed his twelve labours, and are the following:

1. Whilst a child in his cradle, he strangled two serpents, which Juno had sent to destroy him.

2. He slew, in the forest of Lerna, a frightful Hydra with 50 heads; one of which being cut off another immediately sprung up, in its place.

3. He caught and killed, on mount Menalus, an extremely swift hind with golden horns.

4. He overcame Diomedes, king of Thrace, who fed his horses with the flesh of his guests.

5. He took, on mount Erimanthus, in Arcadia, a wild boar, that had spread destruction around the country; and dragged it, alive, to Eurisheus.

6. He tamed a mad bull, which had desolated Crete.

7. He conquered, upon the banks of Tartessus, a giant with three bodies, and of immense stature.

8. He separated two moutains, Calpè and Abila, which were before united; between which, are the present straits of Gibraltar.

9. He carried away the golden apples from the gardens of the Hesperides, after killing the dragon that watched them.

10. He suffocated the giant Antæus, in a contest at wrestling.

11. To ease Atlas, he took the heavens upon his shoulders.

12. He conquered, in the woods of Nemæa, a lion of immense size, and clothed himself with the *skin*.

Q. What, ultimately, became of Hercules?

A. Having slain the Centaur, Nessus, (a huge being, half man and half horse,) the dying monster gave to Dejanira, Hercules' wife, a garment dipped in his own blood, as a preservative for love. This, she sent to Hercules; who had no sooner put it on than he was siezed with violent and incurable pains. He raised a funeral pile on mount Oëta, set fire to it with his own hands, and closed his life in the most dreadful agonies.

Q. Who was Jason, and what is his story?

A. He was the son of Æson and Alcimedè. At the persuasion of his tutor, Pelias, he undertook the Argonautic expedition to Colchis, for the golden fleece, which he carried away.

This fleece was the hide of a golden coloured ram; which was guarded in the grove of Mars, by huge bulls, breathing fire from their nostrils, and by a vast watchful dragon.

Q. Who was Theseus?

A. He was the son of Ægeus, king of Athens, and killed the Minotaur, a monster with a bull's head and a man's body, legs, &c.

Q. Who were Castor and Pollux?

A. The sons of Jupiter, by Leda; who shared immortality by turns.

Q. What of Perseus?

A. He was the son of Jupiter and Danaë, had the wings of Mercury, the shield of Minerva, the

helmet of Pluto, and a sword forged by Vulcan; and, thus armed, he cut off the head of Medusa, chief of the Gorgons.

Q. Who was Æsculapius?

A. The god of physic.

Q. Who was Prometheus?

A. The son of Japetus. He animated a man whom he had formed of clay, with fire, which, by the assistance of Minerva, he stole from heaven; for which he was chained, by Jupiter, to mount Caucasus, with a vulture continually preying on his liver.

Q. Who was Achilles?

A. The son of Thetis, goddess of the sea. His mother dipped him in the Styx, and thereby rendered him invulnerable; all but the heel, by which she held him. He was slain by Paris; who shot him in the heel, at the siege of Troy.

Q. Who was this Paris?

A. The son of Priam, king of Troy, by Hecuba. Juno, Venus and Minerva, being present at the wedding of Thetis and Peleus, the goddess, Discord, threw into the assembly a golden apple, with this inscription: "To the fairest." Each of the three claimed the apple: but, at length, referred the decision to Paris; then feeding his flocks upon mount Ida. He gave judgment in favour of Venus. Paris memorable also for having carried off Helena,

wife of Menelaus, king of Mycenæ; which event occasioned the famous siege of Troy.

Q. What is said of Atlas?

A. That he was the son of Uranus, was a great observer of the stars, and the first who represented the world by a sphere.

Q What is recorded of Ulysses?

A. That, on his return from the Trojan war to the island of Ithaca, of which he was king, the Sirens endeavoured to stop him; but, that he might not be allured by their melody, he closed his ears and caused himself to be tied to the mast.

Q. What is the story of his wife Penelopè?

A. Besieged by a numerous train of lovers in her husband's absence, she delivered herself by artifice. Having, to satisfy them, promised to make choice of one of them, as soon as a piece of tapestry, on which she was at work, should be finished, she took care to unweave, at night, all that she done the preceding day.

Q. Who was Orpheus?

A. The son of Jupiter and Calliopè. He had great skill in music, and took an unconquerable dislike to female society, after the death of his wife Eurydicè.

Q. What of Orion and Osiris?

A. Orion was a mighty hunter; Osiris, called also Apis, and Serapis, was the first who taught the Egyptians to sow corn and plant vines. After his

death, they worshiped him in the form of an ox, as a symbol of husbandry.

Besides the gods and goddesses belonging to the several classes already mentioned, many of the virtues and vices had their peculiar deities.

## HISTORY.

Q. What is history?

A. A written narrative of past transactions, in regular succession.

Q. Is not an acquaintance with history, then, very desirable?

A. Yes; it is a most valuable attainment, and well worthy the attention of all who wish to have their minds enriched from the treasures of experience. As *necessity* has proved herself the mother of invention; so, *experience* will always be acknowledged the parent of wisdom. History, therefore, being an account of what has occurred in real life, and causing all the transactions which it relates to pass, in review, before the mind of the reader, gives him the experience of them; and yields him the wisdom of age, even in the morning of life.

Q. What is necessary to the study of history?

A. Knowledge of geography; which teaches the situation of the places in which the events happened.

Q. How is history divided?

A. Into ancient and modern: which may be subdivided into civil, sacred, and profane.

Q. What is ancient history?

A. An account of all events, whether recorded by sacred or profane writers, from the creation of the world to the birth of Christ; or, more generally, to the time of Charlemagne, in the eighth century.

Q. What is modern history?

A. A relation of whatever has occurred either in church or state, from the latter period to the present time.

Q. What is to be understood by civil history?

A. Civil history is the history of nations, and has relation to the establishment, civil policy, continuance, fall, &c. of empires, kingdoms, states, communities, or cities; and may be either general or particular. The latter recites a series of facts, forming the history of an individual state; the former exhibits, at one view, a distinct account of several states, empires, &c.

Q. *What is sacred history?*

A. It is that part, both of ancient and modern history, which lays before us the mysteries and ceremonies of religion, with the visions, prophecies, miracles, and other supernatural things recorded in the Old and New Testaments, and of which GOD alone is the author.

Q. Do we not sometimes hear of *ecclesiastical church history?*

A. Yes; sacred history, since the destruction Jerusalem, or about the 70th year after the birth Christ, is, very properly, so termed; as it is a n ration of transactions, revolutions, and events, wh particularly relate to the Christian church.

Q. What is profane history?

A. It is, properly, the history of the fabul gods, demi-gods, and heroes of antiquity, usual termed *mythology;* but all records of ancient tim the scriptures excepted, are, sometimes, thus nominated.

Q. How may civil history, or the history of tions, be divided, with regard to time?

A. Into three great intervals.

1. *Obscure, or uncertain, time;* extending from creation of the world to the deluge. This period e braces 1656 years, and is called *obscure,* because h tory has left us in great ignorance with respect to i

2. *Fabulous or heroical time;* extending from deluge to the establishment of the Olympic gam It is called *fabulous, or heroical,* because it is p plexed with the fables of the gods, demi-gods, a heroes of the Greeks; who are said to have liv during this period.

3. *Historical time,* extending from the establis ment of the Olympic games, when history began *be more* authentic, down to the present period.

Q. How may sacred history be divided?

A. Into three parts:—1. The *dispensation of the law of nature;* extending from Adam to Moses—2. The *dispensation of the written law;* extending from Moses to the preaching of the gospel by our Lord Jesus Christ and his apostles—3. The *dispensation of grace;* extending from the establishment of the gospel to the present time.

Q. What is the most ancient history we have?

A. That which is contained in the Old Testament; giving an account of the creation of the world, the fall of our first parents, the general corruptions of mankind, and the universal deluge which came upon the earth, in consequence; the preservation of Noah with his family in the ark, and the re-peopling of the world by his three sons, Shem, Ham, and Japheth; and of their posterity.

Q. What else is recorded in the scriptures?

A. The history of the Jews or Hebrews, once the favourite people of Heaven, in the Old Testament; and the history of our Lord Jesus Christ, the Son of God, and his disciples, in the New.

Q. Does not ancient history recognize the existence of certain extensive monarchies or empires?

A. Yes; four; termed *universal;* because they extended over the greatest part of the then known world.

Q. What was the first of these?

A. The *Assyrian* empire; founded at Babylon,

on the Euphrates, by Nimrod, the grandson of Ham, A. M. 1800; and continued by his son Ninus, and after Ninus, by his wife Semiramis, and terminated under Sardanapalus; having endured 1450 years.

Q. What became of the empire, after the death of Sardanapalus?

A. It was divided into three kingdoms; the kingdom of Media, the kingdom of Assyria, and the kingdom of Babylon. Arbaces, who subdued Sardanapalus, was the first king of the Median kingdom, and Ecbatana was his capital. Phul was the first king of the Assyrian kingdom, and his metropolis was Nineveh. Babylon was the metropolis of the Babylonian kingdom, Nebuchadnezzar was the most celebrated of its kings, and Belshazzar, the last.

Q. What was the second universal monarchy, and by whom founded?

A. The *Persian;* founded by Cyrus, upon the ruins of the Median and Babylonian kingdoms, in the year of the world 3468, and ended with the overthrow of Darius, its last king, by Alexander the Great, A. M. 3670, and before Christ 330: having endured something more than 200 years.

Q. Who was this Cyrus?

A. He was a prince of extraordinary virtue, wisdom, and courage; and is renowned in Holy Writ,

for having effected the restoration of the Israelites from the Babylonish captivity, to Judea, their native land, with permission also to rebuild the temple at Jerusalem.

Q. What was the third universal monarchy, and by whom founded?

A. The *Grecian;* founded, 330 years before Christ, by Alexander the Great. It lasted, however, no longer than the life of its founder; for, at his death, as there was no proper successor, his generals divided the empire among themselves, forming four distinct kingdoms; the Macedonian, the Asiatic, the Syrian, and the Egyptian. These subsisted under their own kings, until they were subdued by the Romans.

Q. Why, was Alexander called the *Great?*

A. Not on account of his virtues, but on account of his natural valour, and the great success of his arms; which in the short period of 12 years, subjugated all the nations, from the Adriatic sea, (now the gulf of Venice) to the river Ganges in India.

Q. What was the character of Alexander?

A. He was of an active, vigorous constitution, possessed strong intellectual powers, an aspiring, impetuous disposition, and was very tenacious of his opinion. Under the tuition of the celebrated Aristotle, he made astonishing progress in every

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Q. Did the republic recover its liberty after the death of Cæsar?

A. No: Mark Anthony, a factious, dissolute character, with young Octavius, the nephew of Julius Cæsar, and Lepidus, who commanded an army in Gaul, formed a second triumvirate; and having the soldiery at command, they cruelly banished, or put to death, all who were either wealthy or virtuous, at Rome: Octavius assumed the name of Augustus Cæsar, and the liberties of the people perished 27 years before Christ.

Q. Was this triumvirate of long standing?

A. No; Anthony, by divorcing Octavia, the sister of Cæsar, and attaching himself to Cleopatra, queen of Egypt, drew himself into a war, in which, he and Cleopatra both perished; and Egypt, from that time, became a Roman province. Augustus, now finding himself supreme governor of the Roman people, assumed the imperial dignity, and, under the title of emperor Augustus, governed with great wisdom and moderation for 44 years. It was in the reign of this prince, when all the world was at peace, that our Saviour, Jesus Christ, the true Prince of Peace, was born, at Bethlehem of Judea.

Rome was at this time 50 miles in circumference, and contained 4 millions of inhabitants.

Q. How long did this empire continue, after the birth of Christ?

A. Four hundred and seventy-six years; when Augustulus, the last emperor, was defeated by Odoacer, general of the Heruli. From that time, the Roman empire became a prey to the Goths, Lombards, and Franks; by whom, were established various petty governments, in France, Spain and Italy: some remains of which still exist.

Q. What effects followed the inroads of these barbarians?

A. The temporary destruction of the fine arts, and so great an obscuration of the sun of science and literature, as occasioned the long succeeding period, of nearly 1000 years, to be called the *dark age*.

Printing was at length invented, learning revived, and greater progress was made in civilization than at any other period of history.

Q. When, and by whom, was the foundation of the Present French empire laid?

A. About the year A. D. 481, by the Francs, a German nation, under Clovis; whose posterity sat upon the throne 270 years. The second race began under Pepin, A. D. 751, and was followed by the Capetian race, so called from *Hugh Capet*, a powerful noble who ascended the throne, A. D.

987. This family was succeeded by the house of Valois: and the house of Valois, by that of Bourbon. The execution of Louis XVI. in 1793, seemed to have ended this dynasty: France was, thence, governed as a republic, until 1804; when general Napoleon Buonaparte, a native of Corsica, was made emperor. But Napoleon was finally dethroned in 1815; at which period, Louis the XVIII, a brother of the unfortunate Bourbon, was, a second time, placed upon the throne, by the allied enemies of Buonaparte.

Q. What races of kings have succeeded to the Spanish crown?

A. Spain has been governed since the expulsion of the Romans, by five families; the first race from the Goths; the second, from *Don Pelago;* the third from *Don Sancho,* king of Navarre; the fourth, from the house of Austria, by the marriage of *Juanna,* daughter and heiress of Ferdinand, surnamed the Catholic, to Philip, Archduke of Austria, the eldest son of the emperor Maximilian; and the fifth, from the house of *Bourbon,* through Philip, duke of Anjou, and grandson of Louis XIV; whose descendants now wear the Spanish diadem.

Q. Of what family, is the emperor of Germany?

A. He is a deseendant of Rodolph I., Count of Hapsburg, and Landgrave of Alsace; who was the first of his family that obtained the empire. He was eleeted A. D. 1273.

hovering along the coast of Britain. The Saxons, having got footing in the island, either enslaved or extirpated those whom they came to assist: For, though they were overthrown in many battles, by king Vortimer, the son and successor of Vortigern, and, afterwards, by king Arthur, yet the Britains were, soon after his death, so broken and weakened, that they were forced to retreat, and exchange the richest and most fertile parts of Britain for the mountains of Wales. Thus, the Britains left the stage, and the Saxons entered. By these, the country was divided into seven kingdoms, called the Saxon Heptarchy; which continued for several ages, till the prevailing fortune of the West Saxons united them all into one, by the name of England.

Q. How many kings of the Saxon line succeeded to the crown of England?

A. Fifteen, namely—

EGBERT, 17th king of the West Saxons, and 19th monarch of Britain, was crowned at Winchester, in the year 819, first king of England; died 836; and was succeeded by his son:

ETHELWOLF, died 857, and was succeeded by his son:

ETHELBALD, died 860, and was succeeded by his brother:

ETHELBERT, died 866, and was succeeded by his brother:

ETHELRED I. received a wound in battle, of which he died 872, and was succeeded by his brother:

ALFRED, died 901, and was succeeded by his son:

EDWARD, the elder, died 924, and was succeeded by his son:

ATHELSTAN, died 940, and was succeeded by his brother:

EDMUND I. received a wound, when endeavouring to part two of his servants; of which, he bled to death, 948, and was succeeded by his brother:

EDRED, died 955, and was succeeded by his nephew:

EDWY, eldest son of Edmund I. died of grief, in 959, and was succeeded by his brother:

EDGAR, died 975, and was succeeded by his eldest son:

EDWARD the martyr, stabbed by order of his mother-in-law, 979, was succeeded by his half-brother:

ETHELRED II. died 1016, and was succeeded by his son:

EDMUND II, murdered 1017, and was succeeded by a Dane.

Q. How many kings of the Danish line succeeded?

A. Three, namely—

CANUTE, the Dane, descended from the daughter of Edward the elder, died 1036, and was succeeded by his son:

HARORD I. died 1039, and was succeeded by his brother:

HARDICANUTE, died 1041, who was succeeded by

EDWARD, the Confessor, son of Ethelred II. (of the Saxon line) died Jan. 1066, and was succeeded by

HAROLD II. son of the earl of Kent, slain in battle October 14, 1066; and was succeeded by William the Conqueror.

Q. Name the succession of English monarchs, from William the Conqueror, down to the present time.

A. They are the following:

1st. Four Norman kings; *William*, of Normandy; *William Rufus; Henry* I; and *Stephen.*

2d. Fourteen kings of the family of Plantagenet—

*Henry* II; *Richard* I; *John; Henry* III; *Edward* I; *Edward* II; *Edward* III; *Richard* II; *Henry* IV; *Henry* V; *Henry* VI; *Edward* IV; *Edward* V; *Richard* III.

3d. Five of the house of Tudor—

*Henry* VII; *Henry* VIII; *Edward* VI; *Mary;* and *Elizabeth.*

4th. Six, of the house of Stuart—

*James* I; *Charles* I; *Charles* II; *James* II; *Mary* II, queen of William the third; *Anne.*

5th. One king of the house of Nassau—*William* III.

6th. Three kings of the Brunswick line, which succeeded upon the death of *Anne*—*George* I; *George* II; *George* III.

Q. Please to repeat these a little more in detail.

A. William I, duke of Normandy, was a descendant from Canute, and born 1027; he made a claim to the crown of England, and landed in Sussex, Sept. 29, 1066; defeated the English troops at Hastings, Oct. 14, following, when Harold was slain, and William assumed the title of Conqueror. He was crowned at Westminster, Dec. 25, 1066; wounded, by his son Robert, in Normandy, 1077: his queen, Matilda, a descendant from Alfred, died in Normandy, 1085: he died at Hermentrude, in Normandy, Sept. 9th, 1087; was buried at Caen, and succeeded, in Normandy, by his eldest son, Robert, and in England, by his second surviving son,

William II, born 1057—crowned Sept. 27, 1087—invaded Normandy with success, 1089—killed by accident as he was hunting in New Forest, by sir Walter Tyrrel, Aug. 2d, 1100—was buried at Winchester, and succeeded by his brother,

branch of science, to which it was thought proper to direct his attention; so that he soon became both a scholar and a philosopher.

Alexander, in the early parts of life, gave strong evidence of a noble, virtuous, and generous disposition; but, cruelty, ingratitude and dissipation, disgraced the close of his days, and tarnished all his glory. He died at Babylon, of excessive drinking, in the 32d year of his age, and the 13th of his reign.

Q. What was the fourth universal monarchy?

A. The *Roman;* founded by Romulus, B. C. 753 and, with some changes, continued, until under Augustus Cæsar, it became mistress of the whole earth, excepting China, and some other countries, that were either unknown, inhabited by savage nations, or too inconsiderable to attract regard.

Q. What changes did the Roman government undergo?

A. The first state of Rome was *regal,* under seven successive kings; the second was *consular,* under a series of consuls, for the space of 470 years when, the triumvirate was formed, by Julius Cæsar Pompey, and Crassus, who divided the empire amongst them. Crassus having lost his life in a foreign expedition, Cæsar and Pompey became jealous of each other's power, and a war ensued, in which *Cæsar* ultimately triumphed. He styled himself

perpetual dictator; and was about to take upon him the imperial dignity, when he was assassinated for his usurpation, by a band of the Roman citizens, with Brutus and Cassius at their head.

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, to Philip, Archduke of Austria, the
f the emperor Maximilian; and the fifth,
se of *Bourbon,* through Philip, duke of
grandson of Louis XIV; whose descen-
ear the Spanish diadem.

at family, is the emperor of Germany?

a descendant of Rodolph I., Count of
nd Landgrave of Alsace; who was the
family that obtained the empire. He
A. D. 1273.

Q. Of what family, is the emperor of Turkey?

A. Of the Ottoman family; so called from the warlike Sultan, Othman, or Osman, who, A. D 1300, carried his conquests to a prodigious extent.

Q. At what period, and by what means, did Portugal become a kingdom?

A. Portugal, anciently called Lusitania, became a kingdom about the middle of the twelfth century. Count Henry, receiving some territories bordering upon it, from Alonzo, king of Leon, as marriage dowry with his daughter, expelled the Saracens; and his son, Alonzo, having conquered Lisbon, assumed the title of king of Portugal, A. D. 1146. Philip II. of Spain, seized upon it in 1580; but, in 1640, the duke of Braganza recovered it; and, in his family, it has ever since remained independent of Spain.

Q. What was the former situation of Holland or the United Provinces, now comprised in the kingdom of the Netherlands.

A. They were originally an assemblage of lordships, dependent on Spain; but from which they withdrew, on account of the tyranny of the government, in the reign of Philip II.

Spain, after a tedious war, acknowledged the independence, in the year 1609. They afterward established a republican form of government, and made the executive power hereditary in the family

of the prince of Orange, with the title of Stadtholder. The French expelled the prince in 1795, erected it into a monarchy, under Louis Buonaparte, 1806, and incorporated it with their empire, 1810. After the defeat of Napoleon, at Leipsic, in 1813, the Stadtholder resumed the government, and now reigns there, as king of the Netherlands.

Q. What are the present divisions of Italy?

A. It is divided into—The states of the Church; of which the capital is Rome: Naples, (including the island of Sicily,) of which the capital is Naples: and the several duchies of Parma, Modena, Lunigina, and Lucca.

Q. Give me a short account of England.

A. Before the Romans landed on that island, the Britains, who then possessed the country, were divided into several nations; each governed by its own king. When Britain became a member of the Roman empire, many of their tribes had their own kings, who were suffered to govern, as tributary sovereigns, by their own laws. After the Romans had quitted Britain; upon the irruption of the Goths into Italy, in the 5th century, the supreme government returned to the Britains; who chose for their king, Constantine, brother of Aldroinus, king of Bretagne, in France, a prince of British blood; to whom, succeeded Constantine, his son; then Vortigern, who usurped the crown, and to maintain his usurpation, first called in the Saxons, at that time

hovering along the coast of Britain. The S having got footing in the island, either ensla extirpated those whom they came to assist: though they were overthrown in many battl king Vortimer, the son and successor of Vort and, afterwards, by king Arthur, yet the B were, soon after his death, so broken and w ed, that they were forced to retreat, and ex the richest and most fertile parts of Britain mountains of Wales. Thus, the Britains l stage, and the Saxons entered. By these, the try was divided into seven kingdoms, call Saxon Heptarchy; which continued for severa till the prevailing fortune of the West Saxon ed them all into one, by the name of Englan

Q. How many kings of the Saxon line suc ed to the crown of England?

A. Fifteen, namely—

EGBERT, 17th king of the West Saxons 19th monarch of Britain, was crowned at Wi ter, in the year 819, first king of England; 836; and was succeeded by his son:

ETHELWOLF, died 857, and was succeed his son:

ETHELBALD, died 860, and was succeed his brother:

ETHELBERT, died 866, and was succeed his brother:

HELRED I. received a wound in battle, of
he died 872, and was succeeded by his
:r:

FRED, died 901, and was succeeded by his

WARD, the elder, died 924, and was succeed-
his son:

HELSTAN, died 940, and was succeeded by
other:

MUND I. received a wound, when endeavour-
part two of his servants; of which, he bled
ıth, 948, and was succeeded by his brother:

RED, died 955, and was succeeded by his
:w:

WY, eldest son of Edmund I. died of grief, in
ınd was succeeded by his brother:

GAR, died 975, and was succeeded by his eld-
n:

WARD the martyr, stabbed by order of his
:r-in-law, 979, was succeeded by his half-
er:

HELRED II. died 1016, and was succeeded by
n:

MUND II, murdered 1017, and was succeeded
Dane.

How many kings of the Danish line succeed-

A. Three, namely—

CANUTE, the Dane, descended from the daughter of Edward the elder, died 1036, and was succeeded by his son:

HARORD I. died 1039, and was succeeded by his brother:

HARDICANUTE, died 1041, who was succeeded by

EDWARD, the Confessor, son of Ethelred II. (of the Saxon line) died Jan. 1066, and was succeeded by

HAROLD II. son of the earl of Kent, slain in battle October 14, 1066; and was succeeded by William the Conqueror.

Q. Name the succession of English monarchs, from William the Conqueror, down to the present time.

A. They are the following:

1st. Four Norman kings; *William*, of Normandy; *William Rufus; Henry* I; and *Stephen.*

2d. Fourteen kings of the family of Plantagenet—

*Henry* II; *Richard* I; *John; Henry* III; *Edward* I; *Edward* II; *Edward* III; *Richard* II; *Henry* IV; *Henry* V; *Henry* VI; *Edward* IV; *Edward* V; *Richard* III.

3d. Five of the house of Tudor—

*Henry* VII; *Henry* VIII; *Edward* VI; *Mary;* and *Elizabeth.*

4th. Six, of the house of Stuart—

*James* I; *Charles* I; *Charles* II; *James* II; *Mary* II, queen of William the third; *Anne.*

5th. One king of the house of Nassau—*William* III.

6th. Three kings of the Brunswick line, which succeeded upon the death of *Anne*—*George* I; *George* II; *George* III.

Q. Please to repeat these a little more in detail.

A. William I, duke of Normandy, was a descendant from Canute, and born 1027; he made a claim to the crown of England, and landed in Sussex, Sept. 29, 1066; defeated the English troops at Hastings, Oct. 14, following, when Harold was slain, and William assumed the title of Conqueror. He was crowned at Westminster, Dec. 25, 1066; wounded, by his son Robert, in Normandy, 1077: his queen, Matilda, a descendant from Alfred, died in Normandy, 1085: he died at Hermentrude, in Normandy, Sept. 9th, 1087; was buried at Caen, and succeeded, in Normandy, by his eldest son, Robert, and in England, by his second surviving son,

William II, born 1057—crowned Sept. 27, 1087—invaded Normandy with success, 1089—killed by accident as he was hunting in New Forest, by sir Walter Tyrrel, Aug. 2d, 1100—was buried at Winchester, and succeeded by his brother,

HENRY I. born 1068—crowned Aug. 5th, 1100, married Matilda, daughter of Malcolm, king of Scots, Nov. 11th following—defeated his brother Robert, in Normandy, 1107, and sent him prisoner to England—his eldest son shipwrecked and lost in coming from Normandy, 1120—surfeited himself with eating lampreys at Lyons, in Normandy, and died Dec. 1st, 1135—was buried at Reading, and succeeded by his nephew, Stephen, third son of his sister, Adela, by the earl of Blois, though, by will, he left his dominions to his daughter, Matilda.

STEPHEN, born 1105; crowned Dec. 26, 1135; taken prisoner at Lincoln, by the earl of Gloucester, Matilda's brother, 1141, but afterwards released for the earl of Gloucester, who was taken at Winchester: he made peace with Henry, Matilda's son, 1153; died at Dover, Oct. 25, 1154; was buried at Feversham, and succeeded by

HENRY II. grandson of Henry I. born 1133; crowned with his queen Eleanor, Dec. 19, 1154; invaded Ireland, and conquered it, 1172; imprisoned his queen, on account of Rosamond, his concubine, 1173; did penance at Becket's tomb, 1174; took the king of Scotland prisoner, 1175; had an amour with Alice of France, the intended princess of his son Richard, 1181; his son Richard rebels, 1185. He died of grief, in Normandy, 1189; was buried at Fonteveraud, in France, and succeeded *by his son,*

Richard I. born at Oxford, 1157; crowned Sept. 3, 1189; conquered the island of Cyprus, and there married Berengera, daughter of the king of Navarre, 1191; was arrested, near Vienna, by the duke of Austria, Dec. 20, 1192; ransomed for 40,000*l.* and returned to England, March 20, 1193—wounded with an arrow at Chalus, in Normandy, and died April 6, 1199—was buried at Fonteveraud, and succeeded by his brother,

John, born 1166—crowned May 27, 1199—divorced his wife, Avisa, and married Isabella, daughter of the count of Angoselme, 1200—took his nephew, Arthur, prisoner, 1202, whom he murdered—imprisoned his queen, and banished all the clergy, 1208—was excommunicated, 1209—surrendered his crown to Pandolf, the Pope's legate, May 25th, 1213—absolved, July 20th following—obliged by the barons to confirm Magna Charta, 1215—died at Newark, Oct. 18, 1216—was buried at Worcester, and succeeded by his son,

Henry III. born 1207—crowned in Gloucester, Oct. 28, 1216—crowned at Westminster, 1219—married Eleanor, daughter of the count of Provence, 1236—pledged his crown, plate, and jewels, for money, 1248—obliged, by his nobles, to resign the power of a sovereign, and sell Normandy and Anjou to the French, 1258—taken prisoner at Lewes, May 14th, 1264—wounded at the battle of Evesham, Aug. 4, 1265—died at Bury, St. Ed-

mund's, Nov. 16th, 1272—was interred at Westminster, and succeeded by his son,

EDWARD I. born 1239—married Eleanor, princess of Castile, 1253—wounded in the Holy Land, by a poisoned dagger, but recovered by his princess sucking out the venom, 1271—proclaimed king, on the death of his father, 1272—landed in England, July 25, and crowned, Aug. 19, 1274—reduced the Welsh princes, 1282—his queen died of a fever, 1290—conquered Scotland, 1296; and brought to Westminster their coronation chair, &c.—married Margaret, sister to the king of France, 1299—died at Burgh, in Cumberland, July 7, 1307—was buried at Westminster, and succeeded by his son,

EDWARD II. born 1284—created prince of Wales, 1300, and was the first king of England's son that had the title—married Isabel, daughter of the king of France, Jan. 23, 1208—crowned Feb. 24, following—obliged by the barons to invest the government of the kingdom in 21 persons, March 16, 1310—declared his queen and all her adherents enemies to the kingdom, 1325—dethroned Jan. 13, 1327, and succeeded by his son, Edward III.—was murdered at Berkley-castle, Sept. 21 following, and buried at Gloucester.

EDWARD III. born at Windsor, 1312—married Philippa, daughter of the earl of Hainault, 1326—*accepted the* crown on his father's forced resigna-

n, and was crowned Jan. 26, 1327—claimed the wn of France, 1329—confined his mother Isa-la, and caused her favourite, Mortimer, to be nged, 1330—defeated the Scots at Hallidown, y 19, 1333—invaded France, and assumed the ignia, 1339—defeated the French, at Cressey, g. 26, 1346, and his queen took the king of otland prisoner the same year—took Calais after ear's siege, Aug. 4, 1347—instituted the order he Garter, 1349—his queen died, 1369—he died Richmond, June 21, 1377—was buried at West-nster, and succeeded by his grandson, Richard son of

*Edward*, the black prince, born 1330—created ke of Cornwall, 1337, (the first in England that e the title of duke) was created prince of ales, 1344—defeated the French at Poictiers, ct. 19, 1356, and brought their king prisoner to ndon, May 14, 1357—married Joanna, countess wager of Holland, 1362—died of a consumption, 76, and was buried at Canterbury.]

*John of Gaunt*, fourth son of Edward III., born 40—married Blanch, daughter of the duke of ncaster, 1359, by whom he became possessed of t dukedom and title—she died 1369, and in 72, he married the daughter of the king of Cas-e and Leon, and took that title—married Catha-e Swinford, 1396, by whom he had four chil-en in the lifetime of his former duchess, who

were afterwards made legitimate by act of parliament; (from the eldest, Henry VII descended;) he died 1399, and was buried in St. Paul's, London.]

Richard II, born 1367—crowned July 16th, 1377—married Ann, sister to the emperor of Germany, 1382, who died 1395—married Isabella, daughter of the king of France, 1396—caused his uncle Thomas, duke of Gloucester, to be smothered, 1397—was taken prisoner by his cousin Henry, duke of Lancaster, and sent to the Tower, Sept. 1st, 1399—resigned his crown, Sept. 29th following, was succeeded by Henry IV; and murdered in Pontefract castle, Jan. 1400: was buried at Langley, but removed by Henry V, to Westminster.

Henry IV, duke of Lancaster, grandson of Edward III, born 1367—married Mary, daughter of the earl of Hertford, who died 1394—fought with the duke of Norfolk, 1397, and banished—returned to England, in arms, against Richard II, and deposed him, Sept. 29th, 1399—crowned Oct. 13th following, when he instituted the order of the Bath—married Joan of Navarre, widow of the duke of Bretagne, 1403—died of an apoplexy, March 20th, 1413—was buried at Canterbury, and succeeded by his son,

Henry V, born 1386—defeated the Welch in *two battles*, 1405—was crowned April 9th, 1413—

claimed the crown of France, 1414—gained the victory of Agincourt, Oct. 24, 1415—pledged his regalia for money, to push his conquests, 1416—declared regent, and married Catharine of France, 1420—died at Rouen, Aug. 31st, 1422—was buried at Westminster, and succeeded by his only son,

Henry VI, born 1321—succeeded his father, and was proclaimed king of France, 1422—crowned at Westminster, November 6th, 1429—crowned at Paris, Dec. 17th, 1430—married Margaret, daughter of the duke of Anjou, 1445—ordered Humphrey, duke of Gloucester, his uncle, to be strangled, 1447—was taken prisoner at Northampton, July 9th, 1460—deposed, March 5, 1461, by his fourth cousin, Edward IV—restored to his throne 1470—taken prisoner, again, April 11th, 1471—his queen and son taken prisoner, at Tewkesbury, by Edward, May 4th, the same year, and his son killed in cold blood—he was murdered in the Tower, June 20th, following, and buried at Chertsey abbey, but removed to Windsor.

Edward IV, deseended from the third son of Edward III, was born 1443—elected king, March 5th, and crowned June 28th, 1461—sent the earl of Warwick to demand the sister of the queen of France, and in the meantime married Elizabeth, the widow of sir John Gray, 1464—was taken prisoner by the earl of Warwick, in Yorkshire, and

expelled the kingdom, 1470—returned, and gained a great victory at Barnet, April 14, 1471—caused the duke of Clarence, his brother, who had joined the earl of Warwick, to be drowned in a butt of Malmsey wine, 1478—he died of an ague, April 9, 1483—was buried at Windsor, and succeeded by his son,

Edward V, born 1470—conveyed to the Tower, May, 1483—deposed June 20 following, and, with the duke of York, his brother, supposed to be murdered, in the tower, soon after—he was succeeded by his uncle,

Richard III, duke of Gloucester, brother to Edward IV, born 1453—made protector of England, May 17, elected king, June 20, and crowned July 6, 1483—slain in battle, at Bosworth field, Aug. 22, 1485—was buried at Leicester, and succeeded by

Henry VII, (see John of Gaunt) born 1455—defeated Richard III, and crowned Oct. 30, 1485—married Elizabeth, daughter of Edward IV, 1486—his eldest son, Arthur, died 1502—his queen died 1503—Married his daughter Margaret to James IV. of Scotland, 1504—from whom, James I. of England descended—died, of a consumption, at Richmond, April 22, 1509—was buried at Westminster, and succeeded by his son,

Henry VIII, born 1491—married Catharine, *infanta* of Spain, widow of his brother Arthur, June

ɪ, 1509—crowned June 24 following; received the title of the Defender of the Faith, 1521—styled Head of the Church, 1531—married Ann Boleyne privately, Nov. 14, 1532—divorced Catharine, May 23, 1533—excommunicated by pope, Paul, Aug. 30. 1535—Catharine, his first queen, died Jan. 8, 1536—beheaded Ann, his second queen, May 19, and married Jane Seymour, May 20, 1526—who died in childbed, Oct. 12, 1537—suppressed the religious foundations in England and Wales, 1539—married Ann of Cleves, Jan. 6, divorced her July 10, and married Catharine Howard, Aug. 8, 1540—beheaded her and lady Rochford, Feb. 12, 1542—married Catharine Par, his sixth wife, July 12, 1543—died of a fever Jan. 28, 1547—was buried at Windsor, and succeeded by his son,

EDWARD VI, born 1537—crowned Feb. 20, 1547—fell sick of the small-pox and measels, 1552—died of a consumption at Greenwich, July 6, 1553—was buried at Westminster, and succeeded, agreeably to his will, by his cousin,

[JANE GRAY, born 1537—proclaimed July 9, 1553—deposed and sent to the Tower, July 28 following—beheaded, with lord Dudley her husband, Feb. 12, 1554, by the order of,]

MARY, daughter of Henry VIII, born Feb. 11, 1516—proclaimed July 19th, and crowned Oct. 1st 1553—married Philip of Spain, 1554—died of a

dropsy, Nov. 17th 1558—was buried at West
ster, and succeeded by her half sister,

ELIZABETH, born Sept. 7th, 1533—sent pri
to the tower, 1554—crowned in Jan. 15, 15
imprisoned Mary of Scots, who had fled to En
for protection, 1568—solicited in marriage b
duke of Anjon, 1571—till he was finally rej
1581—beheaded Mary of Scots, Feb. 8, 1587
feated the Spanish armada, 1588—beheade
earl of Essex, her favourite, Feb. 25th, 1601—
at Richmond, March 24th, 1603—was burie
Westminster, and succeeded by,

JAMES I, (see Henry VII) born June 19th, 15
crowned James VI of Scotland, 1567—ma
Ann, princess of Denmark, 1589—proclaimed
of England, March 24th, and crowned July
1603—first styled king of Great Britain, 16
married his daughter, Elizabeth to Frederick p
palatine of the Rhine, 1612,—from whom Geor
descended; lost his queen, March 3, 1619—die
an ague, at Theobalds, March 27th, 1625—
buried at Westminster, and succeeded by
son,

CHARLES I, born November 19, 1600—mar
Henrietta of France May 11, 1625—was crow
Feb. 2d, 1626—went to the house of Commons
demanded five members, Jan. 1642—raised
standard at Nottingham, August 25 following; g
*himself* into the hands of the Scots at New

May, 5, 1636—sold by the Scots for 200,000*l*. August 8, following; escaped from Hampton-court, July 1648....confined in Windsor castle Dec. 23 following; removed to St. James' Jan. 19, 1649.... was brought to trial the next day, condemned the 27th, beheaded at Whitehall the 30th, and buried at Windsor.

*Oliver Cromwell*, born 1599....made protector, Dec. 16, 1653....elected king, but refused the title, May 8, 1657....died at Whitehall Sept. 3, 1658.

*Richard Cromwell*, born 1623....proclaimed protector, Sept. 4, 1658....deposed April 22, 1659.... died at Chesnut in Hertfordshire, July 12, 1712.

CHARLES II, son of Charles I, born May 29, 1630....escaped into Holland 1648.... landed in Scotland 1650....crowned at Scone, Jan. 1, 1651.... restored to his throne, May 29, 1660....crowned in London April 13, 1661....married Catharine, infanta of Portugal, May 21, 1662....died of an apoplexy, Feb. 6, 1685....was buried at Westminster, and succeeded by his brother,

JAMES II, born Oct. 15, 1633....married Ann Hyde, 1660, who died 1671....married the princess of Modena, 1673....crowned April 23, 1685....fled from his palace Dec. 12, and left England; Dec. 23, 1688....landed at Kinsale, in Ireland, March 12th, 1689....returned to France July, 1690.... died at St. Germain's Aug. 6, 1701.

*James*, duke of Monmouth, natural son of Charles II, landed in England June 11th, and was proclaimed king at Taunton, June 20th, 1685... was defeated near Bridgewater, July 5th, and beheaded on Tower-hill, July 15th, following.]

*Mary* II, (daughter of James II) born April 30th 1662, and married Nov. 4th, 1677, to

WILLIAM III, prince of Orange was born Nov. 4th, 1650, and landed in England with an army, Nov. 4th, 1688....proclaimed king, and his princess queen, of England, Feb. 13th, and crowned April 11th, 1689... landed at Carrickfergus, June 14th, and defeated James II at the Boyne, July 1st, 1690....lost his queen, Dec. 28th 1694....fell from his horse and broke his collar-bone, Feb. 21st, 1702....died at Kensington, March 8th following; was buried at Westminster, and succeeded by his sister-in-law,

Ann, second daughter of James II, born Feb. 6th, 1665.... married to prince George of Denmark, July 28th, 1683....crowned April 23d, 1702....lost her son George by a fever, July 29th, 1700....settled her revenue of the first fruits and tenths on the poorer clergy, 1704....assented to the act of union with Scotland March 6th, 1707....lost her husband Oct. 28th 1708....died of an apoplexy, Aug. 1. 1714.... was buried at Westminster, and succeeded by,

GEORGE I, elector of Hanover, (see James I.) born May 28, 1660....married Sophia, daughter of the duke of Brunswick-Zell, 1682....created duke

of Cambridge, &c. Oct. 5, 1706....proclaimed Aug. 1, landed at Greenwich Sept. 18, and crowned Oct. 20, 1714....his queen died in Germany, Nov. 2, 1726....died of a paralytic disorder at Osnaburg, June 11, 1727....was buried at Hanover, and succeeded by his son,

GEORGE II, born Oct. 30, 1683....married the princess Wilhelmina Caroline Dorothea of Brandenburh-Anspach, 1704....crowned October 11, 1727....married his son, Frederick, to Augusta, princess of Saxe-Gotha, April, 27, 1736....lost his queen Nov. 30, 1737....defeated the French at Dettingen, June 16, 1743....lost his son Frederick March 20, 1751....died suddenly at Kensington, Oct. 25, 1760....was buried at Westminster, and succeeded by his grandson,

GEORGE III, born June 4, 1738....proclaimed Oct. 26, 1760....married Charlotte Sophia (born May, 19, 1744) princess of Meclenburgh-Strelitz, Sept. 18, 1761....and both were crowned Sept. 22, following.

## CHEMISTRY.

Q. What is Chemistry?

A. Chemistry is that science, which teaches us how to ascertain the nature and properties of bo*dies.*

Q. By what means, may the nature and properties of bodies be ascertained?

A. By *analysis*, or decomposition, and *synthesis*, or composition.

Q. How many kinds of bodies are there?

A. Two, only—*simple* or elementary, and *compound*. A *simple* or *elementary body*, is one that consists of only one kind of substance; and is therefore incapable of *decomposition;* as *caloric*, *gold*, *carbon*, &c. A *compound body* is such as consists of more than one simple, or elementary, body; as *air*, *water*, &c.

Q. How many simple bodies do modern Chemists enumerate?

A. Nearly fifty; a few of which are the following: *light*, *caloric*, *oxygen*, *nitrogen*, *hydrogen*, *carbon*, *sulphur*, *phosporus;* (two alkalies,) *potash* and *soda;* (nine earths,) *lime*, *magnesia*, *strontites*, *barytes*, *silex*, &c. (twenty-five metals,) *gold*, *platina*, *silver*, *mercury*, *copper*, *iron*, *tin*, *lead*, *nickle*, *zinc*, &c.

Q. What is understood by the term, affinity, among Chemists?

A. *Affinity* is that particular tendency which the constituent parts of bodies have to blend or unite with each other. When this tendency exists between bodies of the same nature, it is called the *affinity* or *attraction* of *aggregation;* when between

bodies of different natures, it is denominated the *affinity* of *composition*, or *chemical affinity*.

*Note.* As the *affinity*, or *attraction*, of aggregation, unites particles of similar natures, without changing their original properties, the result of such a union, must be a body of the same kind as the particles of which it is composed: but, the compound formed by the chemical union of dissimilar particles, will possess properties totally different from those of its constituent principles. *Sulphuric acid* and *soda*, for instance, though two powerfully corrosive substances, form, when united, the mild and cooling *glauber salts*.

Q. Is not chemical *affinity* stronger between some substances than others?

A. Yes, much stronger. Salt and water, for instance, being put together, will unite, because they have an affinity for each other; but, if a third substance be added, as alcohol, (spirits of wine) for which the water has a stronger affinity than for salt, it will quit the salts which it holds in solution, and unite with the alcohol; leaving the salt *precipitated* or fallen to the bottom of the vessel.

Q. In how many states, may bodies exist?

A. Three; *solid*, *fluid*, and *æriform*. Thus, *ice* is water, in a *solid* form; apply a moderate heat, it becomes a *fluid*—water; apply a strong heat, and it assumes the *æriform state*—steam or *vapour*.

Q. What is light?

A. Light is a simple substance, divisible, by the prism, into seven primitive colours; viz. *red, orange, yellow, green, blue, indigo,* and *violet.* It is refrangible, and has considerable influence on many chemical operations. *Solar* light is here spoken of.

Vegetables derive their colour, taste, and odour, from *light:* hence, warm climates are the most productive of aromatic plants, gums, &c.

The leaves of vegetables yield oxygen, or vital air, during the day; but emit noxious air, at night.

Q. What have you to say of *heat* or *caloric?*

A. The *matter of heat* or *caloric,* is an extremely subtle fluid, that enters, with facility, and pervades, all substances exposed to its influence; and always tends to an equilibrium.

The powers of attraction, uncontroled, would surround us with only *solid compact* bodies: it is to the opposing agency of caloric, we are indebted for the varieties of consistence, under which bodies present themselves to our observation. When *attraction* or *cohesion* prevails, bodies are seen in a *solid state:* when caloric predominates, in a small degree, they are in a *liquid form;* but, when in a high degree, they generally assume the *gaseous,* or *æriform state.*

Q. Does *caloric* pass with equal facility through *all substances?*

A. No; it passes rapidly through metals, less freely through wood or glass, and still more slowly through any woollen substance. Hence, these, and other bodies, are called *good* or *bad conductors*, accordingly as they receive or transmit this fluid more or less rapidly.

Q. Is there not a diversity in the capacity of bodies, for receiving caloric?

A. There is: place, for instance, an equal weight of *lead*, of *chalk*, and of *milk*, in a heated oven, and each will require a different quantum of caloric, to raise it to the temperature of the oven. The lead will receive least; the chalk next; and the milk most.

*Note.* When a body passes from a *solid* to a *fluid*, or from a *fluid* to a *gaseous state*, caloric is absorbed, and becomes *latent* in the absorbing body. When, on the contrary, a body passes from a *gaseous* to a *fluid*, or from a *fluid* to a *solid state*, heat is given out, and becomes sensible heat.

Q. We often hear the term *gas;* as oxygen *gas*, hydrogen *gas*, &c.—pray what is a *gas?*

A. A *gas* is an *æriform fluid;* consisting of some substance chemically combined with caloric, and capable of existing permanently in this state, under the pressure, and at the temperature of the atmosphere. Every individual *gas* is, therefore, composed of two parts; first, the particular substance with which the caloric is combined, and

which forms the *basis* of the *gas;* and, secondly, the caloric itself.

Q. Is not water, then, or any other substance, when evaporated by heat, properly called a *gas?*

A. No; in mere vapour, the union of the caloric, with the substance evaporated, is so slight, that the caloric seizes the first colder body it meets, and the substance held in solution, returns to its original form. But, in *gas*, the union of caloric with the basis, or volatilized substance, is such, as no temperature of the atmosphere can affect.

This union can be destroyed only by the application of some chemical agent, which has a stronger affinity for one of the constituents of the gas, than they have for each other. Every gas is intangible, elastic, and invisible.

All bodies, whether solid or liquid, when volatilized by heat, assume either the *state of vapour*, or that of *gas.*

Q. What is *oxygen?*

A. *Oxygen*, though proved by experiment, to be a simple, and very generally diffused, principle, has never been found in a separate state. It is, therefore, known only by its effects. Several substances, when combined with oxygen, form acids; and many acids, on being deprived of their oxygen, cease to be such: hence, it is inferred, that oxygen is the *acidifying principle.*

Q. Please to give me some account of *oxygen gas*, or *vital air*, as it is sometimes called.

A. *Oxygen gas* is more ponderous than atmospheric air; of which, it forms more than one fourth part:—it is essential to combustion, to animal life, and to the growth of plants; it exists in water, in the proportion of 85 in 100 parts; is found combined with many of the metals, and is a constituent principle in the greater number, if not in all, vegetable, and animal, substances.

*Oxygen gas* is obtained from nitre, by distillation; and also from the black oxyde of manganese, moistened with sulphuric acid, and exposed to heat. A variety of beautiful and interesting experiments are made with this gas.

In every combustion, there is an absorption of *oxygen*—a disengagement of light, and heat, and an increase of weight, in the products of combustion, equal to the weight of the oxygen absorbed.

Q. What is *Nitrogen?*

A. *Nitrogen*, or *Azote*, is the radical of the nitric acid; and, like oxygen, is never found but in a state of combination.

*Nitrogen gas* is a combination of nitrogen with caloric. It is lighter than atmospheric air; of which it forms 77 parts in a hundred. It immediately extinguishes animal life, or a lighted taper immersed in it.

The best method of obtaining *nitrogen gas*, is, to expose a quantity of atmospheric air in a vessel, inverted over a mixture of iron filings and sulphur. The oxygen will be absorbed, and the *nitrogen gas*, or *azote*, left behind.

Q. What kind of substance is Hydrogen?

A. *Hydrogen* is not to be obtained in its pure, concrete state. We are acquainted with it, therefore, only in its gaseous form, as we are with *oxygen* and *nitrogen*.

*Hydrogen gas*, or, as it its more commonly called, *inflammable air*, is a component part of water: it is twelve times lighter than common air; will not, when alone, support combustion, and is destructive to animal life. In contact with common air, it burns brilliantly; and, mixed with a proportion of oxygen, explodes with great violence.

*Hydrogen gas* is obtained, plentifully, by putting a quantity of small nails into a vial, covering them with water, and *gradually* adding sulphuric acid:

The oxygen of the water unites with the iron, and forms an oxide of iron: this oxide is dissolved by the sulphuric acid, and sulphate of iron is produced; while the hydrogen of the water escapes, in the form of *gas* or *inflammable air*.

This gas, combined with oxygen, and ignited, yields the strongest heat that can, in any way, be produced.

Q. What is Carbon?

A. It appears, from a variety of experiments, that the diamond is nothing more than pure *carbon,* in a state of crystallization.

*Charcoal* is *carbon;* though in a less pure, and more imperfect, state. Carbon is *obtained* from animal and vegetable substances, by combustion; is unalterable and indestructible by time; and, in close vessels, by the greatest heat.

Q. What of *carbonic acid?*

A. *Carbonic acid,* or *fixed air,* is found in three states; viz. 1, in a state of *gas;* as, in wells, tombs, cellars, &c. 2, in a state of *mixture;* as in mineral waters: and 3, in a state of *combination;* as, in *limestone, chalks, marble, magnesia, alkalies,* &c. *Carbonic acid gas* consists of 28 parts of *carbon* and 72 of *oxygen,* with a portion of caloric. It is much heavier than atmospheric air, or than any of the other *gases;* so that it may be poured, as a liquid, from one vessel to another. It extinguishes flame, destroys animal life, turns blue vegetables red, neutralizes alkalies, and precipitates lime-water.

*Carbonic acid gas* is readily procured by pouring sulphuric acid, diluted with water, upon powdered chalk. The sulphuric acid unites with the *chalk,* and forms sulphate of lime (or plaster of Paris;) while the carbonic acid is disengaged, and escapes in the form of *gas.*

Water may be made to absorb three times its own bulk of this gas; from which it acquires an agreeable, acidulous taste.

*Q.* What have you to say of *atmospheric, common, air?*

A. That it is not, as has been supposed, a simple substance, but a *compound body;* consisting of about ¼ *oxygen gas,* and ¾ *nitrogen gas,* with a small portion of *carbonic acid gas,*—say one hundreth part. It is *invisible, ponderous, inodorous, elastic,* and *insipid.*

A considerable portion of this air is decomposed in its passage through the lungs, during respiration. The oxygen of the air unites with the blood, and gives it a bright vermillion colour. This is gradually lost, during the circulation; and the blood, assuming a dark purple, returns through the veins, to the lungs: where, it again takes its florid hue, from fresh supplies of oxygen. The oxygen, thus taken into the circulation, gradually evolves caloric, as it passes through the system; hence, what is called *animal heat.*

A person, breathing, exhausts the oxygen of one gallon of atmospheric air, in one minute; and the same quantity will support the combustion of an ordinary candle for the same length of time, and no longer.

Q. What is water?

A. Water is a transparent fluid; composed of 15 parts of *hydrogen gas*, and 85 of *oxygen gas*, by weight; or 2½ hydrogen to one of oxygen, in bulk. If these two gases be mixed in these proportions, and fired by means of an electric spark, a quantity of water will be generated, just equal, in weight, to the gases. Water exists in almost all bodies, of the animal, vegetable, and mineral kingdoms. At 32 degrees of Farenheit's Thermometer, water is frozen: above this temperature, it assumes a liquid form; and at 212° it is converted into vapour.

River, or even rain, water, though purer than any other, is never found entirely free from a portion of salts, acids, &c. but may be purified by distillation.

Water, by passing through an ignited iron tube, will be decomposed; the oxygen will unite with the iron, and the hydrogen will escape, in the form of gas. But a better mode of decomposing it, is that mentioned for obtaining *hydrogen gas*.

Q. What is sulphur?

A. Sulphur is a simple substance, of an orange yellow collour. It burns with a blue flame, and exhales a strong, penetrating, odour.

Sulphur burned with substances containing oxygen, forms *sulphuric acid:* which acid, united to certain bases, forms salts, called sulphates; as, *sulphate of Soda*, or *Glauber salt; sulphate of potash*, &c.

Q. What kind of substance is Phosphorus?

A. Phosphorus is a substance of the consistence of wax, of a flesh colour, and, when pure, transparent. It is luminous in the dark, and soluble in alcohol, and in the essential oils. It is procured from bones, which contain phospate of lime.

*Phosphorus* takes fire at about 100 degrees of Farenheit. It then combines with the oxygen of the atmosphere, and yields *phosphoric acid.*

Q. What of Alkalies?

A. Alkalies have an acrid, unpleasant taste; change blue vegetable colours into green, (indigo excepted;) effervesce, with some acids, and form neutral salts, with all. They render oils miscible with water, in forming soaps.

Q. How many fixed alkalies are there?

A. Two; *potash*, or the *vegetable alkali*, and *soda*, or the *mineral alkali.* There is also a *volatile alkali—ammoniac.*

The *vegetable alkali*, Potash, according to Sir Humphrey Davy, the celebrated English chemist, is composed of oxygen, and a metallic basis, called by him, *potasium.* It is obtained from the ashes of vegetables, and from the lees of wine.

The *mineral alkali*, soda, is found in a native state, in Egypt, but is generally obtained from the ashes of marine plants. It is said, by Davy, to be similar in its formation to potash; having for its *basis* a metal, which he has named *sodium.*

Alkalies readily combine with sulphur. If pure liquid alkali be digested upon sulphur, the mixture becomes reddish, and is called *liver* of *sulphur*, or *sulphuret of alkali*. This liver of sulphur dissolves metals; even gold itself.

Vegetable and mineral alkalies have the property of forming glass, with silex; without being volatilized by heat.

The *volatile alkali*, ammoniac or hartshorn, is composed of 193 parts of hydrogen and 807 of nitrogen, in a 1000. It is usually obtained by the distillation of animal substances; as, hoofs, horns, bones, &c.

Q. What are the constituents of *alcohol?*

A. *Alcohol*, or *spirits of wine*, is a compound of carbon, hydrogen, and oxygen.

Q. Of what, do *oils* consist?

A. *Oils* consist of carbon and hydrogen; and are divided into fixed and volatile. The former is obtained by expression—the latter, by distillation.

Q. How are acids formed?

A. *Acids* are formed by the combination of oxygen with certain bases, which give name to the compound: as, *nitric acid;* which is composed of about 80 parts of oxygen, and 20 of nitrogen.

Q. What are the general properties of acids?

A. *Acids* have a sour, stiptic taste; effervesce with alkalies, and change blue vegetable colours

into red—indigo excepted. They are about forty in number.

Q. What kind of substance is *alumine?*

A. *Alumine*, or *pure clay*, is soft to the touch, and adhesive to the tongue; forms a paste with water, dissolves in every acid, hardens and contracts by fire, and is twice the weight of water.

Q. How are metallic substances distinguished?

A. Metals are distinguished by their gravity, their opacity, or their brilliancy. They are found in the bowels of the earth, in a native or virgin state; in a state of oxydation, or of combination.

All metals are soluble in acids; and being so dissolved, they form *metallic salts.*

Gold, silver, and platina, are considered as *perfect metals*, being with more difficulty oxydized than the others; which are called *imperfect metals.*

(See mineralogy.)

Q. What are Vegetables?

A. Vegetables are organized, living substances; possessing digestive and secreting organs. Vegetables may be considered as the lowest order of animated existences. Like animals, they digest their food, and propagate their species. They will grow and vegetate in air in which animals have perished. This fact evinces, that, though light is essential to their proper growth, yet *atmospheric air* is not.

The constituent principles of vegetables are mor numerous and complicated than those of minerals They are defended by a general covering, of bark which is analogous to the skin of animals, and con ists of three parts—the *cuticle*, the *cellular*, an he *corticle*.

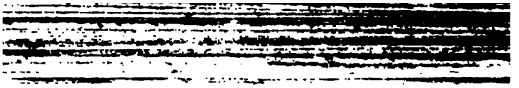
The leaves perform an important office in th conomy of vegetables; and have been compare o the lungs of animals. They extract, from th tmosphere, the same principles which the root lraw from the earth.

Q. What does the term, Animal, imply?

A. The term animal, in a general sense, is ap plied to every thing that is supposed to be alive t he sensations of pleasure and pain. Such are *me quadrupeds*, *birds*, *fishes*, *reptiles*, and *insects*.

Linnæus says, that stones grow; vegetable grow and live; animals grow, live, and feel.

The constituent radical principles of animals re carbon, hydrogen, nitrogen, oxygen, lime, an phosphorus.

Having thus briefly touched upon a very few o he numerous subjects of chemical investigation ve conclude this article, by observing, that ther s, perhaps, no branch of science which so wonder ully displays the extent of the Divine wisdom an goodness as this; and, at the same time, so inter sts and gratifies the inquisitive mind.

THE END.